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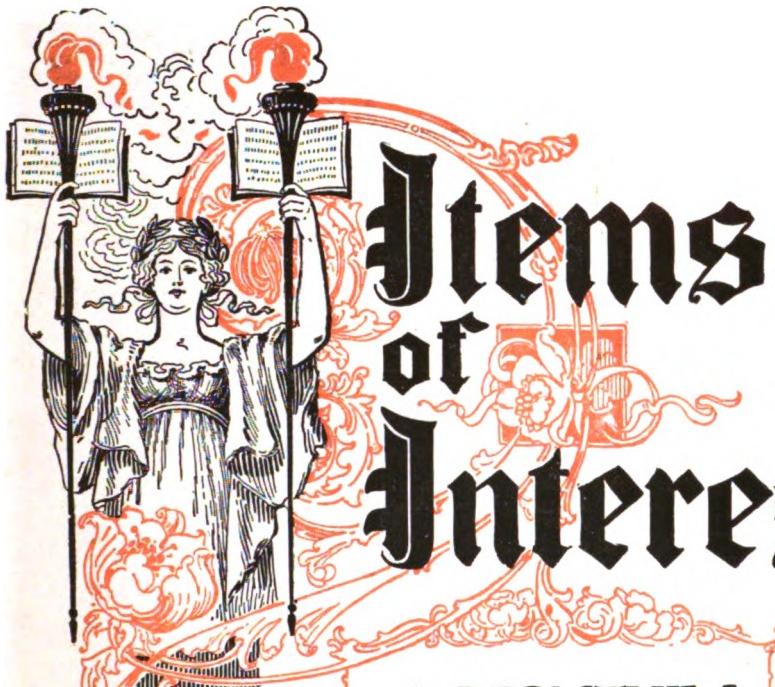


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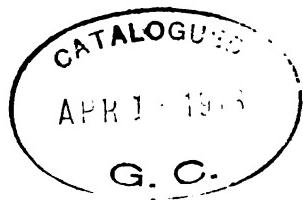
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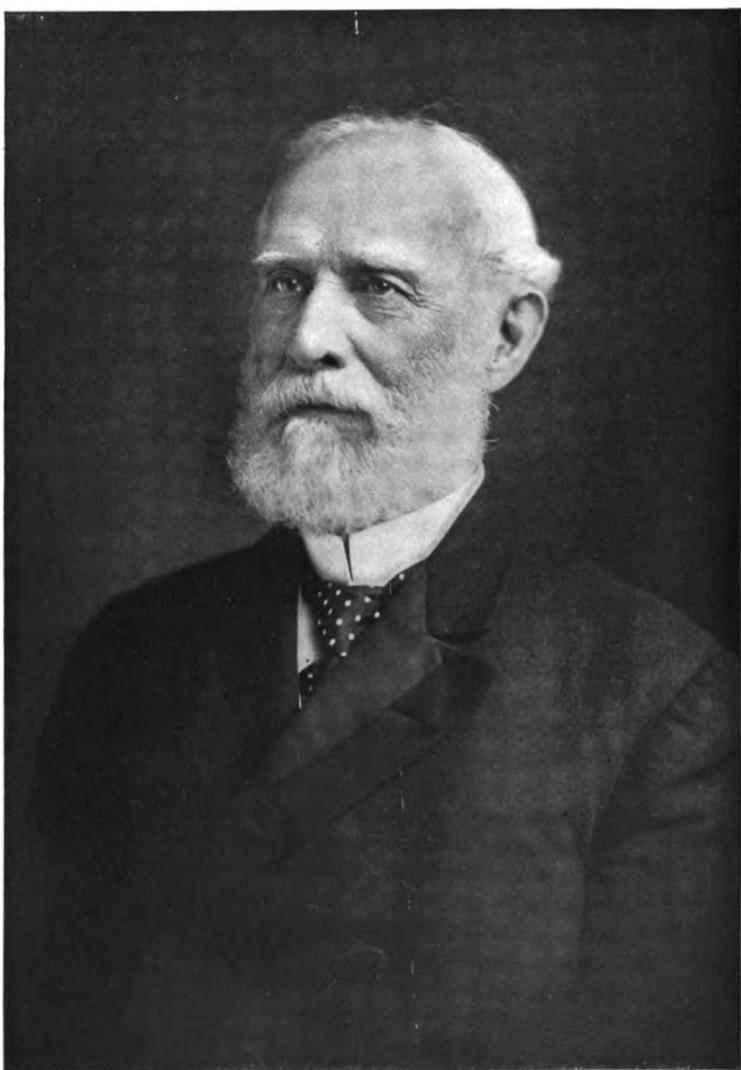
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JAMES TRUMAN, D.D.S., LL.D.

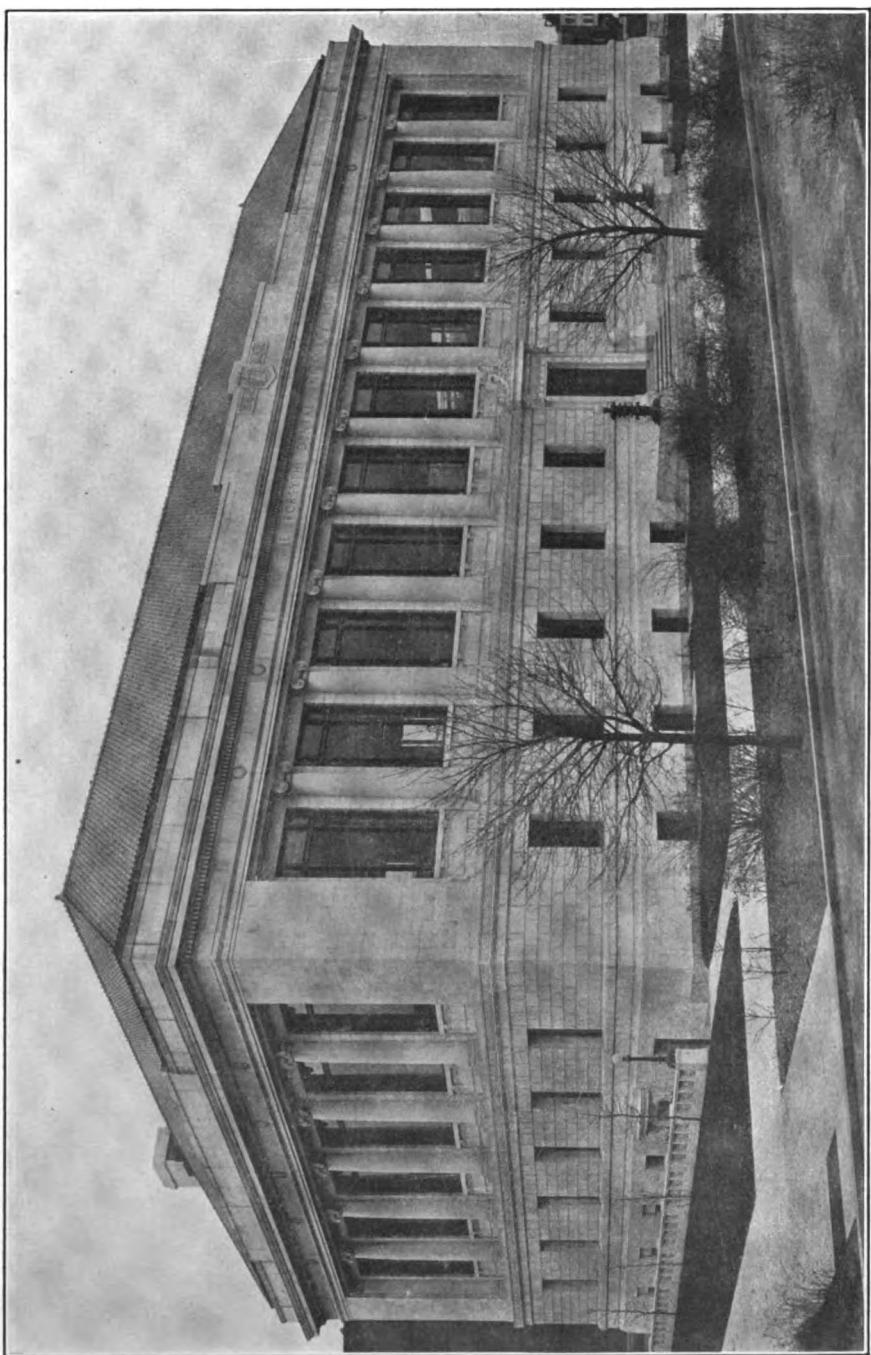


Dedication of the Forsyth Dental Infirmary for Children.

The dental profession of this country has long been looking forward to and dreaming of the Forsyth Dental Infirmary for Children, and it is a great pleasure, at last, to be able to announce the complete fulfillment of the great promise made by those public-spirited benefactors, the Forsyth brothers.

The dedication and first formal exhibition of the building occurred on November 24, 1914, a date that must ever live in dental and municipal history as marking the day on which dentistry at last arrived at the final stage of its career as a beneficent profession. Within less than a single century dentistry has been elevated from the position of something less than a mechanic art, to a respected position among the learned professions. Within that period of time we have seen the dental college, the dental journal, and the dental society come into being. And now, through the great generosity of the Forsyths, we have lived to see the first great dental hospital, through the existence of which Dentistry may take a place beside its older sister, Medicine, by recognizing and catering to the needs of the very poor. It is to be hoped that the example set by the Forsyths will be followed by the generous rich of other cities, and that similar institutions will become fairly common throughout the land. But nothing can deprive the Forsyths of the credit due them of being the pioneers in this splendid contribution to professional charity, and the day

Items of Interest



FORSYTH INFIRMARY

must come when somewhere on the land which the city has purchased between the Infirmary and the Art Museum, the municipality of Boston will erect a fitting monument to the Forsyth brothers.

In his address at the dedicatory exercises Mr. Thomas Alexander Forsyth explained that the building, aside from its usefulness as a dental infirmary, was likewise erected as a memorial to James Bennett and George Henry Forsyth, and that for this reason it "embodies many artistic features usually lacking in buildings intended solely for hospital purposes."

That this is true one suspects as soon as his vision falls upon the exterior of the great building which, with its beautiful simplicity of lines, yet stands out as one of the most artistic architectural triumphs of Boston. At the portal the visitor immediately recognizes that art as well as usefulness is to be a predominant note. The massive doors are of solid bronze, ornamented with splendidly modelled symbolic figures in low relief, one entitled, "The Mother, Giver of Life and Love," and the other, "The Commonwealth, Giver of Health and Learning," the evident moral being that when the mother gives to her country her sons and daughters, it becomes the duty of the commonwealth, not alone to furnish them with education, but while doing this to safeguard their health. In calling attention of all municipalities to this most evident duty to its citizenry, the writer would ask the much quoted question enunciated by Dr. Mayo: "Will they do it!"

Too much credit cannot be given to the men who have labored to make the construction and equipment of this building so perfect that it will stand as a model for others for many years to come. While in a sense a hospital, yet in essential details it so differs from medical hospitals that in order to meet the high standards of equipment, upon which the committee had set their minds, it was necessary actually to create many things which appear in this building for the first time. The sanitary appliances are so many and so perfect that as the visitor is shown first one and then another feature his wonder grows, until finally as he passes out again through the great bronze doors, the dominant idea within his mind is to the effect that "disease may enter but cannot continue to exist in that building."

It will be impossible within the scope of this report to recount and describe all the marvels of this great institution, but no dentist who can afford to visit Boston within the coming year should fail to inspect the Forsyth Dental Infirmary. He will not alone enjoy his visit, but he will come away inspired to do better things in his own practice, and to feel more than ever proud of his membership in the dental profession.

Besides the great infirmary, at present furnished with sixty-five

Items of Interest



BRONZE FRONT DOORS

chairs, but with room for one hundred and ten, there is a model little surgery, equipped with dental chair and also a surgical operating table, both on rollers so that they may be readily moved, and placed in the centre of a little amphitheatre which will seat fifty or more men, thus making of it a splendid clinic room. Adjacent to the surgery is a perfectly appointed small hospital. No other word adequately describes it. Here we find a number of bedrooms and a sanitary kitchen. Thus, after operations, however severe, the patient may be fully cared for until convalescent. Nearby is a thoroughly equipped extracting room, a feature of which is a series of mouth rinsing basins, graded in height from the floor to accomodate children of different ages. Above the infirmary is the X-ray room with the most modern high powered apparatus, and all the latest devices for safeguarding the operators. One of the most interesting rooms, perhaps, is the sterilizing room. Each operator has several duplicate sets of instruments, and after use, the entire tray containing the set used is sent below to the sterilizer. Here a mammoth cage moves on an overhead trolley from the door of the elevator, across the room and into the sterilizing oven, so that if needful the instruments from all the infirmary chairs may be sterilized at one time. Here also we find the newest methods of sterilizing all other articles used in the building.

On the first floor are several rooms of interest, including the Director's Room, the Founder's Room (shown in the illustration), a beautiful Lecture Room, with a white screen for lantern projections built into one wall, and to the writer's mind the most attractive room in the entire building, the Reception Room for Children.

It is with regret that we find ourselves unable to present a full picture of this room. Herein is embodied that love of children which should and must dominate the hearts of the Directors and operators, if the Forsyth Dental Infirmary is to fulfill the evident wishes of the founders. The psychological influence of this room upon the plastic minds of children cannot but be beneficial. The first visit of the child to the dental office is usually mixed with dread. As soon as a child is brought into the Reception Room of the Forsyth Dental Infirmary, all fear must vanish. Here at once the little one will intuitively recognize that only kindly acts by kindly persons are to be anticipated.

The room is spacious, with gently arched ceiling ornately tessellated. The walls are tiled and richly decorated with tiled panels (shown in the illustrations) which, if the writer was correctly informed, won a ten thousand dollar prize in competition, and which therefore were made especially for the Forsyth Dental Infirmary. In the centre of this room are two large aquaria filled with ornamental fish. Around the room



are scattered low tables, and diminutive arm chairs which give to the place the atmosphere of a Lilliputian Club Room. On the tables are reading matter, picture books and games, and the writer was told that in front of the great fire-place there will possibly be a sand pile, where the children may play. This room is so attractive one wonders how the children will be tempted to leave it for the infirmary.



INFIRMARY

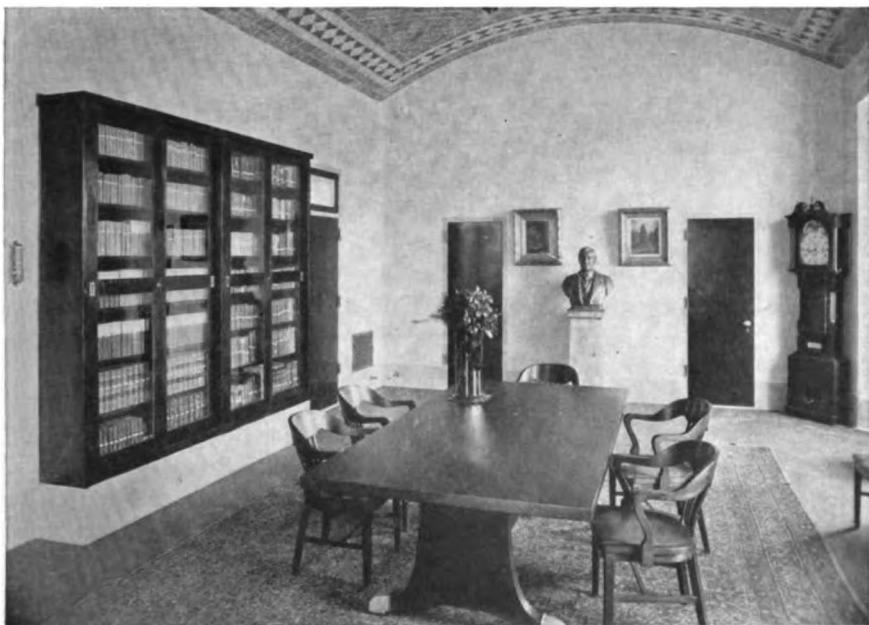
More, much more could be said of this institution. It is difficult to do justice to the subject without specific information as to details of construction and equipment, which are not at hand. It might be well to add, however, that there is not a drinking cup in the Infirmary, nor enough wood in the entire building from which to make a match.

The dedicatory exercises were held in the Infirmary beginning at 10 A. M. promptly. Dr. Edwin T. Darby, of the University of Pennsylvania, presided and introduced the several speakers, and musical numbers were fittingly furnished by a chorus of school children. At four o'clock in the afternoon tea was served in charge of a committee of ladies, and occasion was thus afforded for visitors to inspect the building. In the evening a banquet was tendered to Mr. Thomas Alexander Forsyth, and thus ended a most memorable day. The following addresses were made during the morning exercises:

Address by the Hon. James M. Curley, Mayor of Boston.

Boston has ever been blessed with loyal sons who have made her name one to conjure with in every section of the entire world.

Foremost in their sacrifice of life and fortune in time of strife for the cause of liberty; generous and humane in their consideration of humanity in times of peace.



FOUNDER'S ROOM

The labor of her sons has made Boston first among the cities of the new world in liberty, in education and humane industrial progress.

This magnificent institution adds one more of those unique distinctions, which, like milestones, mark the progress of our fair city. Dedicated to a more virile and happy womanhood and manhood, it will ever continue to shed lustre on its donors. It will prove an inspiring influence for better direction in the care of the young to be adopted, let us hope, by other progressive cities throughout the world.

The Forsyth brothers, one of whom, thank God, is with us to-day, Thomas Alexander, with the others, James Bennett, George Henry, and John Hamilton, who, from their place in heaven which their sacrifice and toil has merited, must gaze with both satisfaction and pleasure upon these exercises.



This building will ever remain a monument to their toil, thrift and love of humanity. What a contrast is here presented. Women and men assembled to dedicate an institution having for its purpose the lengthening of human life, while on the other side of the Atlantic men are engaged in the destruction of human life.

It is difficult for one to forego the thought that the time has arrived in human progress when the citizen soldiery, toiling in the trenches of industrial progress, should outrank in public esteem and admiration the destructive forces representing armies and navies, which it has been customary to deify in every land and in every age.

This institution, in my opinion, will prove not only a blessing to the children whose sufferings it will alleviate and whose bodies it will strengthen, but should tend to so change the current of public thought as to cause its donors, the Forsyth brothers, to outrank in the estimation of thinking women and men, the greatest warriors of our time.

Boston to-day is proud of her distinguished son, Thomas A. Forsyth, and his splendid contribution to humanity, and it is an exceeding pleasure to announce in recognition of appreciation of the Municipality his appointment as Trustee of the Boston City Hospital, where in a larger but no less responsible measure his splendid attainments may continue to benefit the unfortunate and needy of the entire city.

I have been impressed with the extreme modesty and simplicity of manner of Thomas A. Forsyth, and no man to whom those beautiful lines of O'Reilly entitled, "What is Good?" more fittingly apply.

"What is really good?"
I asked in musing mood.
Order said the law court;
Knowledge said the school;
Truth said the wise man;
Pleasure said the fool;
Love said the maiden;
Beauty said the page;
Freedom said the dreamer;
Home said the sage;
Fame said the soldier;
Equity the seer;
Spake my heart full sadly:
"The answer is not here."
Then within my bosom
Softly this I heard:
"Each heart holds the secret:
Kindness is the word."

Address by Charles W. Eliot, LL.D., President Emeritus Harvard University.

The advance of applied science, and particularly of chemistry, physics, and bacteriology, within the past seventy years, has nowhere taken effect more advantageously than in dental medicine and dental art. American inventiveness took effect chiefly in the tools and mechanical processes of dentistry. German chemical science made valuable additions to the materials with which teeth are filled, or "stopped," as the British say; and the electric current made possible the use of machine drills, burs, and polishers on the teeth. Bacteriology had shed a flood of light on the processes of inflammation and suppuration, and on the methods of contagion or infection; both chemistry and physics have supplied various means of preventing or diminishing pain in dental operations; and the electric light has made it possible to perform dental operations during a much larger portion of the twenty-four hours than was formerly possible. Moreover these new resources of dentistry have spread over the civilized world so that in all parts of the orient, as well as the occident, you may find admirably equipped dental offices where all dental work can be done with the appliances and materials which are nowadays found in the best American dental offices. I have never seen in any city a more perfectly equipped dental laboratory than I saw two and one-half years ago in Tientsin, China. To be sure, it belonged to an American dentist; but all the nations that are represented in the treaty port, Tientsin, including the Chinese, availed themselves of the skill and equipment of this American dentist.

The field of work for the dentist has been much extended during the last twenty years. The most skillful dentists now operate on many portions of the mouth beside the teeth. The remedying of cleft palate has become a dental specialty; and broken jaws are now dealt with in large hospitals by dentists, rather than by ordinary surgeons. The dentist's means of diagnosis have also been greatly improved; and no medical or surgical practitioner is more helped by the X-rays than the dental practitioner in serious cases of malformation or injury.

These improvements in the science and art of dentistry have enabled the profession to do for individuals much more than they were formerly able to do for the prevention of pain and discomfort, the preservation of health and the prolongation of life; but simultaneously with this larger possibility of service has come the greater cost of the service; so that the skillful treatment of the teeth from childhood to age has become more and more the privilege of the well-to-do, the poor being unable to pay for the costly labors of the accomplished dentist. A clear perception of the deprivations which the less fortunate or less successful portion of the community suffers in this respect has led to the establishment and



endowment of this Forsyth Dental Infirmary for Children. In this beautiful and perfectly equipped building the children of persons whose earnings are not much more than sufficient to cover the ordinary expenses of their families are to obtain, at merely nominal cost, as skillful dental service as the well-to-do can buy for their children; and through the services of trained dental nurses, the persons responsible at home for the children here treated, will be taught how to keep the children's mouths in as good order as their general health may permit. In my view, the teaching func-



TILE PANELS OF RIP VAN WINKLE

tion of this institution will be the most telling part of its total work. It is well to put a child's teeth in good order for once, and at the moment the child leaves the dental chair; but it is better to teach the mother or the sister at home how to keep that child's mouth in good order. The conservative ends of modern dentistry cannot be fulfilled without the following-up method of the modern hospital. The addition to a dispensary or an outpatient department of a hospital of that kind of social service which follows up the patients, teaches somebody at home the continuous treatment which should be administered, and sees that the patient returns to the hospital or dispensary again and again until cure is effected, is the most important addition that has been made within my memory to hospital and dispensary practice. It will receive in this institution an admirable demonstration of its far-reaching usefulness.

This building is a monument as well as an infirmary and school. It perfectly illustrates one of the admirable traits of successful business men in the United States—the desire on their part to make use of their private earnings and accumulations to advance some beneficial public un-



dertaking. It also illustrates fraternal love and concord. Long may it stand to speak to coming generations of these fine human qualities, and to relieve pain, promote health and prolong life.

Address by Mr. Thomas Alexander Forsyth.

Mr. Chairman, Ladies and Gentlemen: It seems fitting that I should say a few words to you in regard to the origin and perfection of this new undertaking.



TILE OF DORCHESTER GIANT



TILE PANELS OF PAUL REVERE'S RIDE

The idea of providing an institution for the care of the teeth of the children of Boston was first conceived by my brother James Bennett Forsyth, who died in the year 1909. In carrying out his wishes, my brother and myself desired to erect the infirmary in memory of our brothers, James Bennett and George Henry Forsyth. The building is therefore essentially a memorial foundation. While the consideration of its direct uses was constantly before our mind in its planning and construction, the idea that it was also to be a memorial has never been lost sight of. The building on this account embodies many artistic features usually lacking in buildings intended solely for hospital purposes.

In the construction of this institution we have entered a new field. No other building of this character is in existence. The problems we have faced have been encountered for the first time, and for their final solution I

have to thank our building committee of the Trustees, who have given generously of their time, their thought and of their expert knowledge. To their devotion the building owes its evolution and the extraordinary perfection of its professional detail. To the Mayor and City Council of Boston thanks are also due for their judicious foresight in the purchase of the land between the Infirmary and the Art Museum. Such promptitude as they have shown in this connection cannot fail to act as a spur to other gifts to the city.

It has been my wish that the Infirmary should be as a home to the children, beautiful and cheerful; a protector of their health, a refuge in their pain. By making them healthier and happier I hope it may make them grow to be better citizens of our beloved Boston. If this is accomplished, as I believe it must be with the co-operation of the Dental Profession, I shall feel that the gift has been well bestowed.

**Mr. Edward C. P.
Graham, Architect
of the Building.**

I have the honor to announce to you the completion of this building, and I deliver to you this key as symbolic of its transference from the hand of the builder to the hand of the donor.

Mr. Forsyth. I accept this key and I present it to you, Dr. Dowsley, as the representative of the Board of Trustees, and of the Dental Profession of Massachusetts, to so administer this trust that it may secure in the highest degree the purposes we all have nearest at heart.

Dr. Dowsley. In behalf of the Trustees of the Forsyth Dental Infirmary for Children, and of the Dental Profession of Massachusetts, I accept this trust, and I assure you, sir, that we shall spare no endeavor to fulfill the purpose of your noble benevolence.

Address by Dr. Milton J. Rosenau, Harvard University.

I bring greetings of admiration and respect from the medical profession to the dental profession. More particularly do I bring the greetings of one medical specialty to another medical specialty; that is an appreciation of preventive medicine to the achievements of dentistry. It is not clear to all perhaps that dentistry is only one of the many medical specialties. The practice of dentistry is based upon the same fundamental sciences that give precision to the practice of medicine, surgery, and obstetrics. Furthermore, all true advances in medicine, including dentistry, are based upon additions to our knowledge gained through the scientific method of experimental research. Thus the principles of aseptic surgery apply to dental surgery with the same force and with the same good results as they do to general surgery. On the other hand researches



into the causes of dental caries have given us a clearer insight into the methods of preventing and curing these disfiguring and disabling lesions. Medicine and surgery have profited by these and other advances in the science of dentistry, but the world is especially indebted to two practitioners of dentistry for "God's highest mercy brought by man to man" in the warfare against pain; that is surgical anaesthesia. The achievements of Morton and Wells as well as those of Miller and Angle have helped to ease the burdens of mankind.

A tiny nerve, a little artery, and other minute structures enter the root of each tooth through a small opening at its tip. These vital structures unite the teeth with the rest of our body in a most intimate way. The teeth grind the food we eat in order to prepare it the better for digestion. After the food is digested and absorbed it enters the blood, courses through the body and some of it flows through the little artery into each tooth to furnish it the materials necessary for its growth and also to furnish it substances that preserve it against decay. The integrity of the tooth, then, depends upon its vital connections by means of nerves and blood vessels that bind it to the body; on the other hand, the health and vigor of the body in no small part depends upon the soundness of the teeth.

The practice and science of dentistry have become important chapters in the great book of preventive medicine. When we consider that the majority of infectious diseases to which flesh is heir enter by the mouth we begin to appreciate the importance of oral prophylaxis, and also understand the measure of protection afforded by clean and sound teeth, and clean and healthy mucous membranes. Tuberculosis, diphtheria, scarlet fever, measles, whooping-cough, mumps, pneumonitis, influenza, cerebro-spinal fever, common colds, and a great many other infections enter our systems through the nose and mouth; hence, the critical importance of cleanliness, sanitary habits, and oral prophylaxis in preventive medicine. Many of these communicable diseases occur in early life, and therefore, the Forsyth Dental Infirmary for Children is destined to play an important rôle in the fight against disease.

One of the greatest practical advances made in this decade is the knowledge that many cases of "rheumatism" are due to little foci of inflammation or little collections of pus somewhere in the body. Remove the focus and the "rheumatism" disappears like magic. These foci often occur as little abscesses about the roots of the teeth; perhaps they are not painful, show no swelling, and do not make their presence known, yet these little collections of pus may be seen as a shadow by the X-ray. Again dentistry looms large in the prevention and cure of one of the most baffling of maladies.

Deformities of the jaws and malpositions of the teeth interfere with the proper development and functions of the brain. The correction of these deformities in time will convert the stupid dunce into a wide-awake alert, energetic youth. Such miracles are among the striking achievements of modern dentistry, and excite the admiration of the student of preventive medicine. By the early recognition of cancer and other serious maladies which may be cured if diagnosed in time, dentists have the same responsibilities and the same opportunities as physicians and surgeons.

Dentistry has taken a dignified place in the great edifice of the sanitary sciences. It guards the gateway of many infections and, hence becomes an important portal of protection. This noble building is not alone a monument to the wisdom and foresight of its founder, but a recognition of the great service of science to the welfare of mankind. To us it is even more than that, for it emphasizes the overshadowing influence of American dentistry and of American dentists. Nowhere in the wide world will you find a like endowment dedicated to the good of man. Life has been made surer and life has been made longer through the achievements in the sanitary sciences. The object of preventive medicine, however, is not simply to prolong life, for there is little use in living longer unless we can live healthier, cleaner and better lives. To help improve the daily efficiency and increase the happiness and comfort of mankind is one of the services and privileges of dentistry.

Address by Donald M. Gallie, D.D.S., President National Dental Association.

Mr. Chairman, Mr. Forsyth, Ladies and Gentlemen: I wonder if there has lived an American man or woman who has not had a great desire to visit Boston? Her colonial history, the part she played in the founding of these United States, the prominence of her sons in war, statescraft, letters and philanthropy, the pre-eminence of her educational institutions, the architectural beauty of her buildings, the acknowledged culture of her people, and her great interest in humanity's betterment, makes this city a shrine that every American should visit. I assure you, I deem it the greatest privilege and honor to be the representative of the profession which is to profit so greatly by the ceremonies of to-day.

This magnificent gift and the dedication of this splendid infirmary marks an epoch in the history of dentistry.

The history of dentistry, unlike that of law, divinity, politics and medicine, is comparatively recent. It is true some of the early Egyptian, Greek and Chinese writers made mention of the care of the teeth, and we have in some of the museums of Europe evidence of early dental operations. It was not until about the first quarter of the eighteenth



century that anything worth mentioning was written. About this time Pierre Fouchard, a skillful and learned Frenchman, wrote extensively on the art and science of dentistry. Possessing some social prestige and an extensive acquaintance with the learned men of other professions, he obtained for dentistry a recognition heretofore unknown.

To the French we owe much for the development and progress of dentistry, and this is especially true of early American dentistry, for it was Le Maire and Gardette, two Frenchmen, members of Lafayette's army, who started dentistry on a secure foundation in this new land. Boston has always played an important part in dental advancement. It was here John Baker, one of the first of the English dentists, located, and who had as an apprentice Paul Revere, of Revolutionary fame. It was here that Isaac Greenwood and Josiah Flagg, the two first native American dentists, studied and practiced, and from Revolutionary days to the present time Boston has been a generous contributor to our profession.

The names of John Randall, Josiah Foster Flagg, Nathan Cooley Keep, Daniel Harwood, Josiah Tucker, Thomas Henderson Chandler, and Luther Dimmick Sheppard, grace the rôle of honor of American dentists. It was in Boston that Horace Wells, humanity's benefactor, the discoverer of anesthesia, studied and for a time practiced. Here also practiced Dr. William F. C. Morton, the discoverer of the anesthetic effect of ether. Sharing with Boston as a centre of dental activity was Baltimore. Here a coterie of brilliant men, led by Horace H. Hayden, and later joined by Chapin A. Harris, did splendid service in gaining for dentistry its proper recognition as one of the professions. Through their zeal and efforts, in 1839 the first dental college was organized, the Baltimore College of Dental Surgery, with Chapin A. Harris as Dean. Not satisfied with providing means of educating dentists for the future, these men realized that the education of the men of their time was also necessary. In 1840 the first dental journal was published, known as the *American Journal of Dental Science*. This was immediately followed by the organizing of the first dental society in the world, the American Society of Dental Surgeons, the outgrowth of which is the National Dental Association, which I have the honor to represent to-day. Close upon these important events came the first dental laws introduced and enforced in the State of Alabama. It was the first law for the regulation of the practice of dentistry in any country.

The starting of a dental college, journal, society and laws placed America far in advance of other countries in everything that pertained to the knowledge and practice of dentistry; and this leadership I am pleased to say we still retain, although in other countries remarkable

progress is evident. Since that time colleges have increased until to-day we have over fifty in the United States and Canada. The dental journals and the literature of the profession have increased accordingly. Dental societies are to be found in every State, city, yes, and in some sections every county throughout the country. Every State and territory has laws regulating practice. Every effort is being made to raise the standard of efficiency, higher educational qualifications for college matriculation, extension of the college course and subjects taught, that a graduate of a few years ago would hardly recognize as a part of a dental curriculum; yet with this wonderful advancement, reaching almost perfection in manipulative skill and craftsmanship, in spite of our improved curriculum, we find ourselves unable to keep pace with the ravages of the most prevalent of all diseases, dental caries and oral sepsis.

We know positively that the school children in all highly civilized countries show an alarming percentage of diseased mouths, in some sections as high as ninety per cent. We realized long ago that it was impossible to combat this condition by reparative means; we knew that our only hope was in getting at the cause, but how?

Dental Efforts in Behalf of Children. Only a small percentage could be reached through the dental office; the influence through the home was limited. We knew the only way to reach the masses and start our campaign of education was through the channel that all child education and instruction is obtained, namely, the

public and parochial school. We urged first, dental inspection, then class instruction in the care of the teeth and lectures on oral hygiene. But these suggestions met with strong opposition, not only from the laity, school boards and municipal officials, but in many cases by the medical profession. It was not until epidemics broke out in schools throughout the country and the carrier of contagion was traced to the mouth, teeth and tonsils, that the people and our medical teachers realized the importance of our campaign. In addition, a scientific and practical test was made in the Marion School of Cleveland, which demonstrated conclusively that the mental, moral and physical condition of school children was greatly improved by dental inspection, instruction and care.

In 1911, when preparing the annual message for the Illinois State Dental Society, I wrote to the President of the School Board and the Commissioner of Health of every city in the United States and Canada of over 35,000, of which there are about 130, asking them the following questions:

1. Are the children of the public and parochial schools of your city instructed in the care of the teeth and surrounding tissues?
2. Are the teeth of these children examined by a dentist?

3. Have you any free dental clinic in your city where the teeth of the poor are cared for?

I received sixty-five answers.

To question 1—No, 40; yes, 25

To question 2—No, 52; yes, 13.

To question 3—No, 42; yes, 23.

In answer to question 3, the twenty-three answering yes were practically all from cities having dental colleges. To-day, but three years later, if we were to send out this inquiry we would find that not only in practically all the large cities, but also in scores of the much smaller cities or towns they have inaugurated dental inspection, class instruction, and in many cases some means of caring for the unfortunate. In many of the large cities provision has been made for from five to fifteen clinics, and appropriations for this purpose run as high as \$20,000 yearly. Surely this is making progress, and gratifying as it is, yet how inadequate when we consider the tremendous demand and need! Fortunate indeed is the City of Boston, and blessed are the children of this great city, that they have such a citizen and such a benefactor as Mr. Forsyth, who has given this magnificent infirmary.

Not only have the mouth and teeth been the carriers of contagion and disease to children, but also the cause of many diseases the origin of which was until recently unknown. Hunter, the eminent English physician, claims that a diseased mouth is the most prolific cause for much of the chronic infections, diseased glands, intestinal disorders, nephritis, arthritis, pulmonary affections and heart lesions. Before sixteen hundred physicians and dentists in Chicago a short time ago Dr. Charles Mayo read a paper entitled "The Mouth as a Focus of Infection" He closed in this manner: "The next great step in preventive medicine must be taken by the dental profession; will they take it?"

In answer to that question, our profession, from border to border and from coast to coast, is attempting it, but we must creep before we walk. We have not at present the many advantages that our medical colleagues enjoy. We have no hospital internship; no centre of dental thought and instruction in Vienna, Berlin, Paris, London and Edinburgh; no great postgraduate schools; at the present time no Rockefeller Foundation for Dental Research, no Carnegie Institute, no Johns Hopkins, with their unequalled equipment and unlimited resources. However, we have an army of earnest workers, fully conscious of the great responsibilities placed upon them, who are making every effort to equip themselves for the great work, who are forming study clubs and postgraduate classes in very many of the large cities, where scientific apparatus and laboratory facilities are available. We have State and local societies engaging

eminent scientists to carry on special research. We have a National Dental Association which has grown from 900 two years ago to 14,000 to-day, and which has as component bodies the State and Territorial society of every State and Territory in the Union, and these State and Territorial societies have as component bodies all local, district or county societies within the State, so that to-day the dentist in the remotest hamlet is in touch with the progress of the profession. We have in the National Dental Association a Scientific Foundation and Research Commission composed of twenty-four of our best thinkers and workers, who are doing excellent work and who have already made valuable contributions to our science, and who fully expect within the next year to have a fund of \$200,000 for research purposes. And to-day we have another great aid, the Forsyth Dental Infirmary, which I am sure will prove a great stimulus and inspiration to other good men who, in the near future, will build and endow similar institutions in other great cities of this country.

To-day I feel that our profession is contributing a full measure to the great movement which is going on toward child welfare, race betterment and human uplift.

Mr. Forsyth, in behalf of the dental profession and in behalf of our little patients, I offer you our thanks, and I wish you God's blessing.

Address by Edward F. McSweeney, Chairman Trustees of the Boston Consumptives' Hospital; Chairman the Directors of the Port of Boston.

One inflexible, but little understood, rule of nature is that man can get almost anything in this world if he is but willing to pay its particular price. Riches, power, grandeur, are all for sale in the world's market place, with the price tags plainly marked, unhappiness, disappointment, regret. The law of compensation is seemingly inexorable. We are free agents, and as we choose, so are we. It is only once in a great while that visions from Heaven come to the wealthy, opening to them the real road to personal happiness, and enabling them to use their wealth to prove that the real brotherhood of man is not an empty dream, and that the beatitudes are something more than a beautiful collection of words.

Among the purchasable assets of life is public health, and in no other department of financial investment is the dividend so enormous or the return so speedy.

The opening of this Forsyth Dental Infirmary, following the establishment by the Boston Consumptives' Hospital Department of a hospital at Mattapan, for tuberculous children, whose presence in the public schools constitute a menace to their fellow pupils, gives opportunity to come true the long cherished dream of an efficient partnership between

the various agencies having charge of the health and education of children in this municipality. This dedication is indeed the beginning of a new era in the fight for disease prevention.

The True Starting Point in Prevention of Disease.

No argument is needed to make clear the necessity for preventing disease, prolonging life and stopping premature deaths. We may apply measures of relief for the adult sick and adopt the necessary courses for preventing the spread of disease, but if we are really to conquer this unnecessary waste we must begin with the children of this generation who are now in the public schools. We must consider not alone their immediate physical needs, but the most important, their essential ultimate needs.

Unless the present death rate from tuberculosis is reduced, 12,000 children of the 128,000 scholars now in the Boston public schools will die of tuberculosis. A large number of these victims succumb before reaching the age of twenty-five, without giving anything in return to the State for the money spent on their education, with this number of human units transferred on the ledger of human efficiency, from the asset to the liability column. For those who will die without becoming productive, the city of Boston will expend three million dollars on elementary education alone, so that if we consider the object of education as being the training for efficient citizenship in its broadest sense, these three million dollars will have been wasted.

Medical Inspection in the Boston Schools.

Inspired by the contemplated work of the Forsyth Dental Infirmary, three years ago the city of Boston was induced to begin the work of medical inspection in the public schools on a really efficient basis. It was believed that if parents were advised of the physical defects of their children, these defects would be remedied through their family physicians or the existing clinics. The result of this medical inspection showed that 65 per cent. of all the children of the public schools had physical defects, 80 per cent. of which centered largely in the mouth, such as diseases of the teeth, etc. In the school year 1912-1913 there were 122,459 defects noted, and of this number, during the next school year, the parents had, through their family physicians or the existing clinical agencies, corrected 52,042 defects, or 42 per cent. of the total defects found. Every one of these corrected defects means that the child will have a better chance to escape or conquer disease in later life, after the school days are over.

Scope of Work of the Forsyth Infirmary.

During the last three years, most of the work for the prevention of disease, especially among children, has been done in anticipation of the opening day of this infirmary, which with its splendid facilities will be able to take care of all the children who

may need assistance, but who cannot afford treatment through their family physician. With the establishment of this infirmary, so wisely conceived and so patriotically carried out, the community can feel assured that every child in the Boston public schools will have all existing curable defects remedied before leaving school, thus giving the child a straight road from the school to its chosen path in life.

To accomplish the best results, it is necessary that all the various official bodies working in Boston for health and disease prevention should co-operate. We now have a hospital for tuberculous children, a dental infirmary and special schools for children deficient in various ways. From this beginning, all the children in the public schools should be divided into three groups.

- | | |
|--|---|
| Classification
of Children. | Group I. Hospital cases.
Group II. Deficient and sub-normal children.
Group III. Normal children. |
|--|---|

Group I will comprise all those children who have demonstrable tuberculosis or mental diseases. As fast as a child is found to be placed in this class, it should be placed under the jurisdiction of the hospital department for treatment.

Group II will comprise the deficient and sub-normal, who will be provided for at this dispensary and also at the fresh-air rooms or preventorium, which should be extended as the demand becomes apparent.

Group III includes all those normal children in the public schools in whom no defects have been discovered, or such defects found as may be remedied by existing clinics followed by the hygiene course in the schools.

The authority over Group III shall be wholly in the School Department, the examination of children to be made by the school medical inspectors.

All children suspected of being tuberculous or suffering from some disease requiring hospital care should be closely watched and transferred from Group III to Group II and Group I when necessary, and vice versa as children improve.

**The Road to
Definite Results.** Beginning at the child's entrance to school, its physical condition should be watched from year to year. When defects are found, they should be called to the attention of the parents and a reasonable time given for application of the remedies. Parents of defective children who will not remedy defects when called to their attention are in the minority, but this is one of the most serious parts of our problem, and its solution cannot be considered until we have a more definite knowledge as to whether the parent's failure to comply with the recommendations

of the school physician is due to indifference, ignorance, or poverty, or a combination of all three. When authentic information is secured on this point, we can proceed with certainty, but until this knowledge is obtained, any step to substitute the city for the parent by indiscriminate feeding, etc., is fraught with the most dangerous consequences. If food is a necessary part of the treatment for children in Class II, it should be provided and paid for by the parents, and if necessary supplied by the school at cost. Children who need food and clothing and are unable by real poverty to get either should be supplied temporarily, at least, by private charity until the exact need is ascertained and the city's duties in the matter agreed upon.

In looking after the education, comfort and happiness of its people, Boston is to-day in the first class among the cities of the world. If only a fraction of the results which we expect to obtain from the opening of the Forsyth Dental Infirmary is achieved, it will mean a wonderful advancement in the effort to safeguard life and prevent the waste of needless disease in the coming generation, the like of which has never before been accomplished.

We love Boston because of its humanity. If to-day it seems narrow and provincial, to-morrow it shows its greatness by some noble act of self-sacrifice and devotion to the common good. And of all the worthy benefactions to uplift the lives of our people by giving them free art, music, breathing spaces, hospitals, etc., none will carry out more specifically the command of the Sermon on the Mount than the gift which to-day is so appropriately inaugurated.

Address by Dr. William J. Gallivan, Commissioner of Health, and Chief of Bureau of Child Hygiene, Boston.

The widespread prevalence of dental defects among children would never have been known were it not for the system of school inspection which, beginning in Boston in 1894, has been copied throughout the country and is now practiced in every city of importance in the land.

Improved school inspection required a physical examination; and so, for the past three years, a physical examination has been made annually of practically every school child in Boston. This test includes examinations of heart, lungs, eye, ear, nose, throat and mouth; spine, joints and skin. Our principal interest to-day is the condition of the teeth of school children in Boston, as revealed by these examinations. In order to secure uniformity in diagnosis, school physicians were required to record as defective teeth all cases of dental caries in primary and secondary teeth, and malocclusion of secondary teeth; missing and primary teeth and properly filled secondary teeth were not recorded as defective.

The result of these examinations shows that 46 per cent. of the school children of the city have defective teeth. Children attending the primary and grammar schools were found to be more defective than pupils in the high schools. In the primary schools, 55 per cent. had defective teeth; in the grammar schools, 50 per cent., and in the high schools, 33 per cent. This last item opens up a fruitful field for speculation. However it may be decided on further investigation, it is only conservative to say that dental defects in grammar school children will have to be considered as a factor in the failure of many of them to make the high school.

Similar examination made in the City of New York shows 58 per cent. of the school population afflicted with defective teeth. In Chicago, 40 per cent. are so recorded. In short, a compilation of statistics made by Prof. Wood, of Columbia University, places the school population of this country at 20,000,000, and of this number 10,000,000, or 50 per cent., have defective teeth. From such data we can reasonably infer that defective teeth among school children is a condition not peculiar to Boston alone, but is widespread throughout the whole country. Sound teeth appeal to the average person for their cosmetic value. That dental caries may be the dwelling place for all kinds of bacteria that some day may lay him low probably has never caused him a thought. And yet for some time physicians have known that in the etiology of diphtheria, scarlet fever, pneumonia, tuberculosis, and other respiratory diseases, dental caries play an important part. The wonder of it all is that we have remained inactive for so many years.

Hospital facilities in this city for the care of defects other than teeth detected in school children are ample and sufficient. Up to this hour, hospital facilities for the care of dental defects have been wholly inadequate. Small wonder that those who believe that public health is one of the greatest concerns of government have had their attention attracted to this condition. And so from time to time efforts have been made to provide such dental facilities through municipal appropriation.

Such are the conditions which greet the opening of the Forsyth Dental Infirmary. The relief which this infirmary will afford is incalculable. Of equal importance is its opportunity for the education of countless numbers who can never hope to enter its doors on the value of the early care of the teeth and of the disaster which inevitably follows their neglect.

We welcome this addition to Boston's charity. In its work of preservation of the teeth it will contribute to a large degree to the making of better men and better women. And among all the forces at work in this city for the making of good citizenship, this institution will prove an able ally, and will easily take its place among the most valuable.



American Society of Orthodontists.

Discussion of the Paper of Dr. Ottolengui.

Dr. F. G. Kempler, New York City. I hardly know how to discuss this paper. There is so little that is definitely known about root resorption that we can do little more in a discussion of the question than to theorize as to its cause; but

when we meet it in practice we sorely realize its effect. The essayist has given us in this paper additional clinical facts as he has collected them, but he has been unable to throw any light on the cause. The problem remains to be solved, and until it is solved, root resorption must stand as a serious obstacle in the way of successful treatment of a certain class of cases of malocclusion. The percentage of cases in which it becomes a factor is great enough to make it a question of considerable importance, and I express again the hope that Dr. Ottolengui will continue to collect clinical facts bearing on this subject and that he will present them to us in future papers.

The fact that the pulp continues to live during the resorption of the roots seems to indicate that the process might be identical with the process of resorption of deciduous tooth roots. As far as trauma is concerned in this process it may be a factor in a few cases. Excessive stress from occlusion on one or two teeth is, in my opinion, a very great factor in stimulating the rapidity of the resorption process when it has once started, and I believe that excessive stress of occlusion alone, if it is continuous for any considerable time, is sufficient to start the resorption.

The radiographs that were thrown on the screen all show the crypts of erupting teeth to be in close proximity to the roots that are being resorbed. The resorption in these cases may be caused either by the slight pressure created by the follicle surrounding the crown of the



erupting tooth, or it may be the action of the crypt itself. It is possible for very slight pressure to stimulate a giant cell activity in the root that will destroy it, just as it is possible for slight pressure of soft tissue in other parts of the body to cause resorption of bone. Examples of bone



Fig. 1.

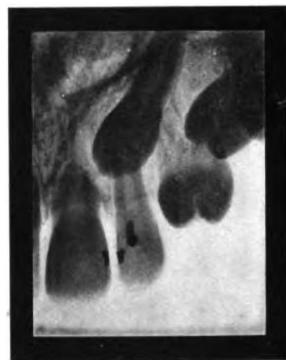


Fig. 2.



Fig. 3.



Fig. 4.

resorption from tumors, aortic aneurisms, etc., etc., are very common; frequently the body of the sternum will be resorbed until it is completely perforated from the slight pressure produced by an aortic aneurism. There seems to be a similarity between these two processes, and it might throw some light on the subject if our pathologists could examine specimens of both and note the possible relation.

One of the disappointing features of this process in the cases that have been under consideration is that in some of them the resorption seems to be progressive even after the pressure has been relieved and all disturbing causes apparently removed. It may not be as rapid, but in

one or two of the cases referred to by the essayist it was continuous to the point of the tooth being lost. In such cases, instead of allowing the resorption to continue, I have thought it might be good treatment to amputate the resorbing portion of the root. By an operation of this kind the giant cells that are causing the trouble could be removed, a healthy wound would be created and further destruction of the root might be



Fig. 5.

Fig. 6.

Fig. 7.

prevented. Such an experimental operation is, in my opinion, entirely justifiable in all cases where the resorative process is obstinately progressive.

Description of Illustrations. In Fig. 1, the crowns of the cuspids were erupting in a diagonal position in front of the roots of the laterals, and were pointed toward the apices of the roots of the centrals. The centrals were not being moved; they are not attached to the appliance, but, nevertheless, they became very loose and I became much alarmed. Pins had been set in the crowns of the cuspids and they were being moved distally, away from the roots of the centrals. The illustration shows the resorption of the root of the central, while the root of the lateral is practically intact and not affected so far as we are able to tell by the radiograph. The laterals were tipped labially by the crowns of the cuspids passing in front of their roots. The crowns of the cuspids, judging from the X-ray, are much closer to the roots of the laterals than they are to the centrals, and yet it is the roots of the centrals that have suffered.

Fig. 2 shows the right central and lateral of the same mouth.

Dr. Federspiel.

How old was that patient?

About fourteen. Figs. 3 and 4 are radiographs of the same case taken only a few days ago, and seem to show the resorption to be progressive.

J. Member.

Were the teeth ever fully developed?

Dr. Kemple. I cannot say, but I should assume that they were. Fig. 5 was made in January, 1913; the patient was fourteen years of age; the left deciduous cuspid

was in place and showed only slight resorption. The crypt of the erupting cuspid is fairly well outlined, and the apex of the root of the first bicuspids has begun to resorb. Fig. 7, the third of this series, taken June 13, 1914, shows fairly well the amount of resorption and does not indicate that the destruction in this instance has been perceptibly progressive.

Dr. Ottolengui.

How do you account for the light area over the bicuspids?

Dr. Kemple. I believe the light area marks the location of the permanent cuspid before it was moved. The cancellous tissue here has not yet become as dense as in the other portions where it has not been disturbed.

Dr. Federspiel.

What is the age of that patient?

Dr. Kemple. Between fourteen and fifteen years when the first radiograph was made. In this case, if the resorption of the root of the first bicuspid were shown to be progressive, I believe it would be a justifiable operation to amputate the apex.

**Dr. G. J. Grileves,
Baltimore.**

I have been working on a similar line in relation to the resorption of the cemental apex in pulpless teeth, with much the same results as Dr. Ottolengui shows here to-day. Some of these cases were reported in Philadelphia, but I do not care for these to appear in print yet, as the findings have not been verified.

I believe that the cementum of the root of every tooth, the pulp of which has been successfully devitalized and the root filled, will be found to be vital, and that if you make a section, a large part of the pericemental apex, particularly that near the periodontal membrane, will be living cementum. I have been cutting many sections and have been fortunate enough to see some made by Dr. Fletcher, of Cincinnati, and I believe that in every case there is a certain amount of resorption of this cementum, and the type of resorption found is the physiological type of rounded bays, not the jagged absorption common to infected or necrotic areas. I am not speaking of infection, but of normal resorption such as occurs around the roots of temporary teeth. The reason I mention this is because the types are so similar and the pictures are very like those shown by Dr. Ottolengui.

Dr. Ottolengui spoke of pressure as one of the causes of root resorp-



tion: It occurs to me that there were no cases reported of children who were not in a way under pressure. That is the reason why they consult you; all cases requiring orthodontic treatment are at some point impacted or under pressure. The formation of normal bone is a wasteful process indeed; it is laid down only to be absorbed again and again. You have these trophic conditions in the alveolus of every patient on whom you work and it seems to me that pressure or a little more blood to the part might easily produce root as well as normal bone resorption.

Dr. Kemple's remarks regarding aneurism and his statement that the hard tissues are always subject to and under the control of the soft tissues has been amply proven, so that a soft growth like an aneurism can produce bone resorption, and we can readily understand why an advancing tooth would not necessarily need to be in actual contact, and why such stimulation of the tissues would increase blood to the parts and the absorptive processes would go on, we might say normally.

The condition of the cementum directly at the pulp entrance is another feature to be noted in the slides, as compared to my slides of pulpless teeth with vital cementum. In these contrasted with those I have seen, the resorption process seems to dip down into the canal, and in the instances where I knew the pulp had been removed, there was always a "dimple" in the peridental apex. I have seen this in adults and some of it in children in extracted teeth, although I have never had the conception that the whole root, including the dentine, might be riddled or interstitially absorbed as Dr. Ottolengui has shown it to-day; neither did I think the process was so general.

These cases occur in some children, but not in all children, and why should it not occur in every child presenting for treatment? They all come to you because they have the same pressure conditions at some point. I do not want to ride a hobby too hard, but I believe that where this resorption occurs the children are subject to calcic waste. The intake and output of calcium is unbalanced. Calcic waste is one of the great questions before the medical profession to-day. Even in adults, if we have more calcium thrown off than is retained, a very serious nervous breakdown occurs, finally resulting in tetany. Children should store calcium and when calcium metabolism is disturbed there is always some form of serious denutrition. This is the case in rickets, and many intestinal conditions of childhood, as well as marasmus, have been relieved by feeding the child calcium lactate. A great difference has also been noticed in all the nervous symptoms, as well as in the skin and hair, and I believe the bones and teeth would be greatly benefitted, but it is to be understood that this is not the old idea of forcing in a certain percentage of insoluble lime, but rather a stimulation of the whole metabolism of calcium.

Having had much experience, and being a close observer of such conditions as Dr. Ottolengui has referred to, the implantation and replantation of teeth, I want to call attention to my discussion of the subject published in the *Transactions of the American Dental Association* (years ago), which is verified by further experience.

In the case of a tooth that is to be replanted or implanted, it is important to know how best to deal with the root.

I would first like to ask Dr. Ottolengui if he *implanted* or *replanted* the tooth he referred to, and if the root in his case was dressed away with stone or other means, or whether the peridental membrane was scraped from the root or not, or the surface left merely as Nature had prepared it?

In my previous discussion on the subject of implanting and replanting teeth and the value of the operation, I brought out the point that wherever the roots were dressed away or were injured by the use of the forceps, or other injury, as from filing, grinding or scraping the root, so as to remove the peridental membrane; or where there was injury of the apex in filling the pulp canal, that would be the point where the irritation of the soft tissues would cause absorption of the root to begin. In *The American System of Dentistry* and other text books are numbers of illustrations of roots of permanent teeth that have been implanted and replanted, showing the location and extent of their absorption.

In my transplanting and replanting of teeth I became convinced from the results, that when the tooth is extracted by the forceps which generally injures or roughens the surface of the root, if the injury is below the neck of the tooth, it becomes an irritant, and when implanted absorption starts at that point, or at any part of the root where the surface is injured, as when there is any filing of the apex of the root, the absorption will begin there first.

How does Nature retain the replanted tooth in its socket? It is supported by granulation tissue developed about it which enters the normal vascular openings of the canaliculi of the cementum, which are always present on the surface of the cementum.

Those that have been interested in the use of sponge grafting in the healing of wounds to prevent the tissues from wasting more than necessary, know how soft tissue travels through the pores of the sponge, like fingers, in sizable threads, and as these pass through the sponge in all directions they close the wound. I have often pulled on the sponge to see the network of these threads, passing into the sides of it, a few days after its insertion. As I said, if there was anything that would cause their irritation, as a roughened surface, the tissue would become abnormally congested.

Through the vascularity of the granulation tissue entering the vascular openings of the cementum, bone may be deposited extending into the openings of the canaliculi, which would cause bony ankylosis of the tooth. The latter is not an uncommon occurrence.

There is no renewal of life in the tooth resulting from implanting, except the life in the granulated points that enter the vascular openings of the root.

If the root of a permanent tooth becomes absorbed, it is the result of an encroachment upon it, causing irritation. Any irritation of normal tissue causes engorgement and brings about enlargement of the blood vessels which surround the irritated part. From irritation an abnormal amount of blood is concentrated there, with an increased blood pressure at the point, which would cause force on the inner surface of the alveolar process, and this pressure through the vascular net work of the bony portions separating the vessels would cause absorption. In other words, the vessels become swollen, which gradually breaks down the bony walls surrounding the vessels, resulting in the loosening of the tooth in the alveolus. This form of absorption is apparent when a tooth is being moved by force applied by the orthodontist.

I want to say a word about the result of operations by the rhinologist. Often the rhinologist in his effort to increase the capacity of the nasal cavity removes more or less of the bony tissue, which encroachment, near or adjacent to the root, often causes a congestion or inflammation that extends to the periodontal membrane, inducing a congestion, although he may not reach the socket enclosing the root, but be some distance from it. I have known a number of cases where the removal of the bone by the rhinologist has resulted in the death of the pulp and produced more or less further bone absorption. This is important, since we know that all the tissues are subject to absorption, and as they are subject to absorption we should always discover the irritant early. If a tooth has taken mal-position in its development from the germ, as growing forward in the line of the arch, it would lead us to discuss the question as to what is the force that brings about the eruption of the tooth. It is important for us to know. I think the substance of the covering of the enamel portion of the tooth after that part of the tooth is formed is a calcareous deposit, which becomes an irritant to the surrounding tissues, and the inflammatory action causes absorption of the bone or process adjacent to it, and later of the gum tissue.

In all X-ray views of non-eruptive teeth a space is shown between the enamel of the tooth and the bony covering. In other words, the deposit acts as an irritant and absorbs the bone surrounding it and permits the teeth to advance in its eruption. There being at the same time

development of the root portion, this assists in forcing the tooth forward.

Irritation in these parts is naturally depended some on the physical condition of the patient.

Before the discussion is closed there are one or

Dr. James Ernest Walker, New Orleans. two points that need to be cleared up. We have heard that fibres grow into the cementum to hold the tooth in place. I do not think that is what takes place. There are fibers, but the hard tissues build around the fibers. In fact, I think there is throughout life, in normal conditions, a perpetual laying on of minute layers of cementum, in that way affecting continually new attachments of the fibres which hold the tooth in place.

The other point is the question in relation to absorption of one tooth, due to the encroachment of another. It has been said here that they are in contact. If there is absolute contact, the only way you can have any waste of tissue would be by abrasion, the mechanical wear due to the friction of one tooth upon another when in contact. It seems to me, what we have in the case illustrated is a resorption which necessitates soft tissues being in between. The tissues are irritated until the cells have taken on giant form and have caused absorption.

For those who are interested in sponge grafting

Dr. U. K. Jackson. and who would like to know how the soft tissues act in sponge grafting, I will say that Nature sends out a granulation tissue like fingers, and these pass through the sponge. In my experience I have often pulled down upon a tooth and have seen the granular tissue putting out fingers, going forward and penetrating the openings, and if there is an irritant there that tissue becomes congested.

I did not have reference to the arterial loops in

Dr. Walker. embryonal tissue which has just been referred to. A tooth is not held in place by these arterial or capillary loops, but by fibrous tissue. Tissue embryonal in character is seen entering resorptive areas, and it is still there when the resorption area is being refilled, but that is not what holds a tooth in place. The redeposit of cementum encases fibrous tissue which becomes Sharpey's fibers.

Dr. Jackson. Do you consider the root as dead or as having living tissue in the cementum of the tooth?

Dr. Walker. As alive. Resorption goes through the cementum into the dentin, but dentin does not refill the areas; they are filled by cementum even when in the area of the original dentin. Dentin is not built outward, but always inward by the pulp.

Dr. Ottolengui. You are speaking of autogenous natural teeth, while Dr. Jackson was talking about the retention of replanted teeth and teeth that are actually dead.

Dr. Walker. I was not speaking of implanted, replanted, nor of dead roots where we have pathologic absorption, but of physiological resorption which is under discussion and of teeth that are being regulated. This closely resembles, microscopically, the resorption which takes place in reconstruction of the alveolar process and other bone.

I am very glad to have heard this paper. I wish **Dr. B. D. Keeler,** to mention a case of an absorbed left lateral in the **Des Moines, Iowa.** mouth of a boy twelve years of age. I was in doubt whether this was a deciduous or a permanent tooth. The crown is that of a permanent tooth, and after hearing this discussion I am positive it is a permanent left lateral with about one-third of the root resorbed.

The cupid is mesial of normal, lying obliquely in the arch, the crown being in contact with the root of the left central, and in contact also with the left lateral, the root of which latter is one-third absorbed.

I am very much pleased that Dr. Kemple presented **Dr. Ottolengui.** the case which he did, because it accentuates what I said with reference to the desirability of having some radiographs taken before treatment. It must be a source of gratification for Dr. Kemple to know that the tooth which showed resorption had not been interfered with by him, and it will be a double gratification if the patient should ever lose this tooth to know that Dr. Kemple could not be held responsible.

I am sorry Dr. Grieves made some remarks and then forbade us to print them in full. It seems to me, there is a dissimilarity between the cases to which he refers and the cases which interest us, which either he has overlooked, or else did not allude to in his discussion, and that is, that these children's teeth have living pulps in them, and not only did these pulps remain alive during the progress of this disturbance, but they have remained alive after the cessation of it.

I showed on the screen in one case two central incisors, the resorption of which has not progressed in four years. Those teeth are now quite firm. In spite of the fact that they have no roots, they are perfectly healthy in color and are living teeth.

Another point I would like to accentuate is this: There is a clinical aspect in all these radiographs which differentiates this particular kind of resorption from the usual morbid resorption. In morbid resorption we not only have resorption of the root itself, but also resorption of the surrounding bone. Here we appear to have two opposite conditions progressing coincidentally. We have resorption of the root which, of course, would leave a space, were it not for the fact that new alveolar bone fills in that space, as rapidly as the root is shortened. Moreover, unlike new bone which fills into a space once occupied by a granuloma—this new bone cannot be differentiated with the X-ray, from the surrounding bone. It

is this particular clinical aspect which is so similar to the resorption of the temporary teeth.

Dr. Kemple. That is a physiological process.

Dr. Ottolengui. It is similar to a physiological process, but whether it is a physiological process or not, I do not know. I do not see how it can be a physiological process, because what is physiological is according to routine plan. It cannot be according to routine plan that permanent teeth should lose their roots. There is a close analogy between this particular aspect of these two conditions, namely, the bone is built in as fast as the root is absorbed, and the pulp remains alive.

Dr. G. J. Grieves. Dr. Fletcher's slides present exactly the same condition in pulpless teeth, where the apex has not become necrotic nor infected and mine will show the resorptive areas and that secondary cementum or bone does develop; it is sometimes hard to draw the line between cementum and bone.

Dr. Ottolengui. I think we can in implanted teeth.

Dr. Grieves. Am I to understand that you distinguish between the resorptive processes and the deposit of cementum or bone that takes place.

Dr. Ottolengui. I think that the condition of the surrounding bone is quite different in infected cases, from what is seen in these cases of young teeth resorbed without death of the pulp. And I think the clinical pictures of both root and alveolar bone, in cases of implanted or replanted teeth, as again different from either.

Dr. Grieves. Fletcher shows large areas of resorption near the apex containing a secondary deposit of cementum or of bone, but they are not all large, sometimes just a bare deposit of secondary bone following up the resorption of the tooth.

Dr. Ottolengui. In conclusion, I would like to say one thing more: Heretofore we have been studying resorption by sections, always dealing with the dead subject, and our past knowledge has been based upon what the microscopists have told us that they have seen in their pictures. We have had introduced to us to-day another method of getting pictures, and these pictures are from living subjects, and while one or two or three of them may be distorted and may be deceptive, that is equally true with the microscopic slides. Some of them are most deceptive.

The vital part of the subject has not been touched on in discussion. No one has considered the question of whether to check up with radiography before deciding on a plan of treatment. So all of you gentlemen who have not had a beautiful child under your care, with two beautifu' central incisors, which lose their roots while under treatment, take my advice and radiograph freely all doubtful cases before you start, and thus know the conditions.



Root Implantation, Physiologic and Mechanical.

By H. J. KAUFFER, D.D.S., New York City.

Read before the New Jersey State Dental Society, Ocean Grove, July 1914

Responding to the wave of enthusiasm which has awakened the interest of the dental profession to root implantation, mechanical and physiological, and also transplants, I have conducted a series of research experiments upon lower animals to ascertain, if possible, an explanation for the variance of clinical findings in this work.

If one studies the literature on root implantation he is confronted with a wide difference of opinions, with a general conclusion negative to success. These findings are mostly all clinical and give no satisfactory explanation for failure. There are a few reports of retention of roots for a period of years, but invariably the operation has been abandoned owing to the large percentage of failures.

Jones. Civilion Fones, of Bridgeport, in 1876, implanted continuous gum teeth. He removed the platinum pins and ground ridges in the porcelain roots of the teeth which he implanted. He claimed to have had successful retention; however, the method was abandoned.

Younger. Dr. Younger (1) has at various times reported cases of human tooth implantations. He always used the human tooth, not necessarily a freshly extracted tooth.

Amoedo. Dr. Amoedo (2) advocates slight decalcification of the root previous to implanting. "Union is probably due to partial absorption of root and bone tissue

forms. The tooth is thus ankylosed; in some cases there is a fibrous union."

Allen. Dr. F. W. Allen (3) reported cases of human root implantations retained from six to ten years—however, they were supported by a bridge cemented to sound roots.

Rothman and Bilsko. Drs. A. Rothman and G. Bilsko (4) advocates: "Under certain conditions the extraction of a tooth for filling, and when operation is completed they replant the tooth." They report, "174 replantations in a practice of seven years." "86 successful cases have been noted that have been seen after two to seven years." "A great many patients did not present again, and in some cases the replanted teeth had to be removed owing to root absorption. In 46 cases of replantations without root canal fillings, a lower percentage of successful healing was noted than in replantations of treated roots."

This statement would lead one to believe that their work was not conducted in a scientific manner.

Whereas, one may attempt for experimental purposes one or two teeth without removal of pulps and thoroughly sterilizing and filling root canals, when twenty-five per cent. of their work was performed in this manner, your essayist believes that their report of fifty per cent. success in 174 cases a creditable showing for the vitality of the human tooth in replantations.

Jiscari. Dr. Ascari (5) recommends for "relieving the replant from stress while healing" that "the articulation is temporarily raised by a cast aluminum splint until the replanted tooth has become firm." He emphasizes the importance of having the replant "in perfect articulation."

Sabba. Dr. Sabba, Dauzig (6)—"In transplantation and replantation." Dr. Sabba's technique: "The alveolus from which the tooth has been extracted is packed with iodoform gauze and the patient is dismissed, the root canal of the tooth is thoroughly cleaned and filled. The pericementum is entirely removed with a scalpel and burs. The root is left intact, and the tooth is laid in a very dilute carbolic acid solution until the next day."

"When the tooth is introduced it is ligated to the approximating teeth. After a week the ligature is removed. The tooth begins to become firm after that time, being absolutely rigid after about three months. So far no means has been discovered of preventing the resorption of the tooth root, which after a few years produces loosening and loss of the



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tooth. Nevertheless, replanted teeth have remained in the mouth for ten and more years, thus amply justifying this method of tentative preservation."

Your essayist believes Dr. Sabba's suggestion of packing the socket with iodoform gauze to be commendable. However, with the removal of the pericementum, how can one expect other than resorption of a root denuded of this, its protecting membrane?

Schroder. Prof. Dr. Schroder, Berlin (7), found that when various metals are implanted in the jaws of experimental animals in some exceptional favorable cases

the foreign body is surrounded with a connective tissue sheath with little or no tendency to ossification. He states that from his findings it appears that "the implantation of material foreign to bone offers no prospect of real and lasting success, no matter whether the artificial root is introduced into an alveolus covered with periosteum or directly into the bone."

Ivory, on the other hand, is more successful, as it enters into firm union with the bone and is resorbed either not at all or slowly. He reports very satisfactory results from ivory roots implanted in empty alveoli. He, however, makes this statement: "To prevent the possibility of absorption, he strengthened the ivory roots with gold bars imbedded in the roots." Therein your essayist does not see how this would differ materially from metal cribs, other than that the core is of ivory rather than of bone, as in the Greenfield method. Dr. Schroder's paper is illustrated by radiographs and sections.

Bone Plating and Bone Grafting.

The literature on bone surgery, pertaining to bone plating and bone grafting in general surgery, which is receiving such wide recognition at present, is most confusing, and whereas it is highly essential that we thoroughly comprehend what takes place in the repair of bone to intelligently discuss root implantation, I have made a careful study of experimental and clinical reports of this subject by eminent surgeons, and will give you a synopsis of their findings, first considering the use of metal in connection with bone.

Lang. Prof. Lang, of Munich (8)—"Support for the Spondylitic Spine by Use of Buried Steel Bars Attached to the Vertebrae" These bars were coated with tin.

Thomas. Dr. H. J. Thomas (9), in speaking of this, says: "The idea of metal supports beneath the skin is not indeed successful, but is interesting as the forerunner of the bone supports which must now be regarded as successful."

Items of Interest

Your essayist sees here that in general surgery bone grafting, which is at present receiving most enthusiastic attention, appears to be passing through an analogous cycle to root implantation in dentistry.

Dr. Thomas reports out of 450 fractures at Cooks County Hospital Clinic, those in which Lane plates had been used (Lane plates are metal



Fig. 1. Radiograph of Lower Jaw—Experiment 2.
(a) Implanted Human Root. (Note sequestrum encapsulating absorbing root.)

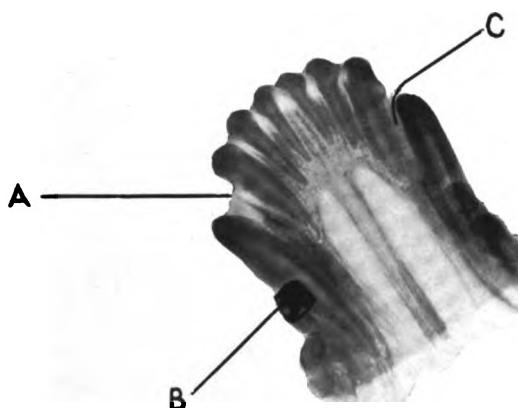


Fig. 2. Radiograph of Upper Jaw—Experiment 2.
(a) Sheep root nursed upon the blood of the dog. (b) Platinum crib. (c) Space where root not nursed upon the blood of the dog was lost.

plates used to immobilize a fracture), 47-7/19 per cent. were removed in subsequent operations.

Dr. A. J. Ochsen (10) believes success or failure **Ochsen.** is entirely a question of "doing bone plating right or wrong." He says: "Dr. Percy at Augustana Hospital has had 108 consecutive cases in which bone plating was used with only five unsatisfactory results. Dr. Lane, who first suggested the use

of metal plates, to immobilize fracture, it is claimed, has less than four per cent. of failure. However, in the Lane technique asepsis is maintained to a degree which would be absolutely impossible in operations within the mouth."

Drs. W. L. and C. B. Brown (11), of El Paso,
W. L. and C. P. in extensive experiments in bone grafting, state:
Brown. "Wherever wire was used there was an absorption of the graft in the neighborhood of the wires, whether

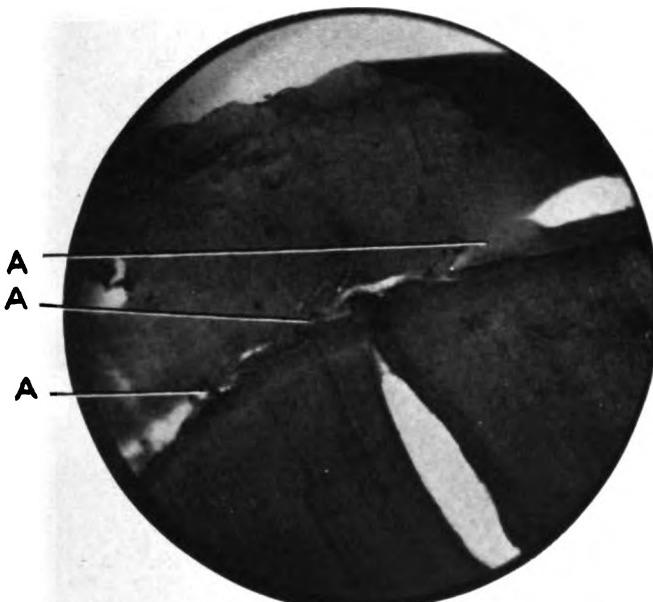


Fig. 8. Transverse Section of Sheep Root—Experiment 2.
 (a) Peridental membrane in co-aposition with tooth and bone.

the bone was drilled through or not." This is also true in the use of wires in kindred work done by McWilliams (12).

On the other hand, Sir William McEwen (13)
McEwen. in three experiments shows where new bone entirely covers silver bands placed around the shaft of the radius denuded of periosteum. However, in this instance, unlike the case above mentioned, and where metal is used in root implants, no pressure was brought to bear upon the bone at the point of metal contact. McEwen makes it plain that metal in an implant will not stand stress.

Dr. Barth (14) stated that: "All living transplanted bone died immediately, whether with or without periosteum, and that it was unimportant whether living or dead bone was used."

Axhausen. Dr. Axhausen (15) says: "There can be no doubt that fresh bone tissue planted in a defect dies throughout, but that the periosteum remains alive and capable of reproducing bone tissue, and it is probable that the bone marrow retains its vitality."

Beattie. Dr. Beattie (16) says: "The periosteum is composed of two layers, the inner being highly vascular and containing numerous osteoblasts. The

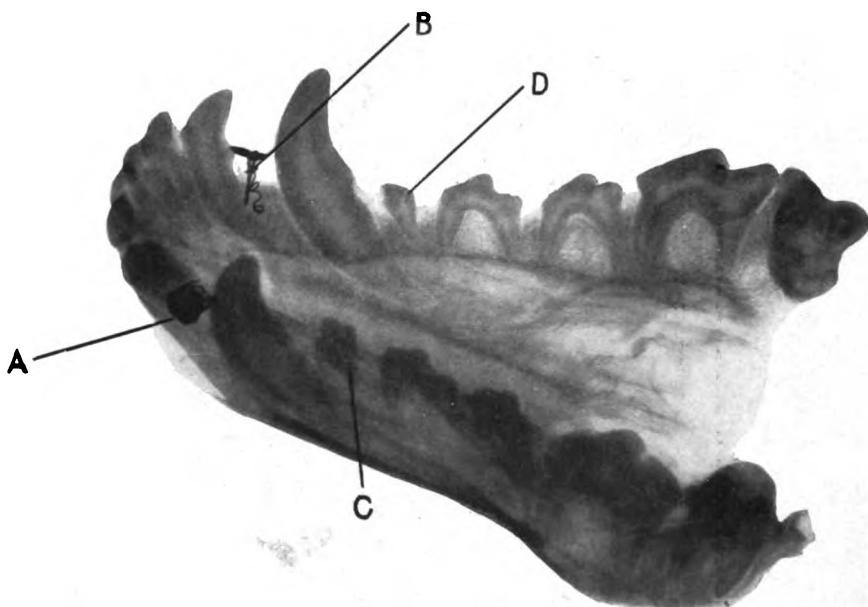


Fig. 4. Radiograph of Upper Jaw—Experiment 3.
 (a) Platinum iridium crib. (b) Platinum iridium spiral. (c) Right bicuspid transplanted in socket of left bicuspid. (d) Bicuspid of another dog transplanted.

power of new bone is not, however, limited to the periosteum, but is also exhibited by the tissue in the cancellous space and the medullary cavity."

Weider. Dr. H. S. Weider (17), in a study of the healing of fractures in 1907, observed that: "The bone cells are confined and also slow to react. They only form bone when liberated. The periosteum is early and free of action. The endosteum is most active. Both periosteum and endosteum produce osteoblasts and osteoclasts."

Murphy. Dr. John B. Murphy (18) believes that the transplant which would be analogous to the core in Greenfield implantations "Always is absorbed, but acts as a scaffolding for the reproduction of new bone."

Cotton and Lodor. Drs. Cotton and Lodor (19): "Uniform survival and healing of graft and microscopically a rapid covering of the graft by new endosteal bone laid down by the activity of the endosteoblasts in all portions of the graft centre and periphery."

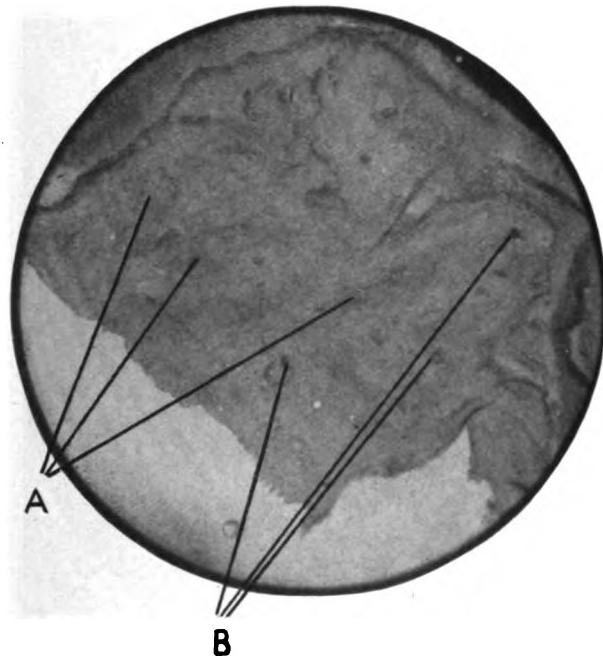


Fig. 5. Transverse Section of New Bone in Spiral.
(a) A metaplasia of fibrous tissue into bone. (b) Particles of powdered bone with new bone forming around them.

McWilliams. Dr. McWilliams (20) believes that "Living bone cells have life inherent in themselves, and that the theory that contact with living bone is necessary for the subsequent life of the graft must be given up." He believes that "All that is necessary to perpetuate the life and proliferation of bone cells is proper and sufficient nourishment," and cites as proof of this statement that "Small bone transplants embedded in muscular tissue lived, while larger ones were absorbed."

Bancroft. Dr. F. W. Bancroft (21) believes in bone repair. There is a metaplasia from the connective tissue cells to osteogenetic cells.



The Author's Experiments.

In his own experiments your essayist transplanted human, pig and sheep roots into the jawbones of dogs—transplanted them into the sockets of freshly extracted teeth and into holes drilled in the jawbone where there had been no teeth. Trephined and implanted iridio-platinum cribs after the Greenfield method and spiral shaped iridio-platinum

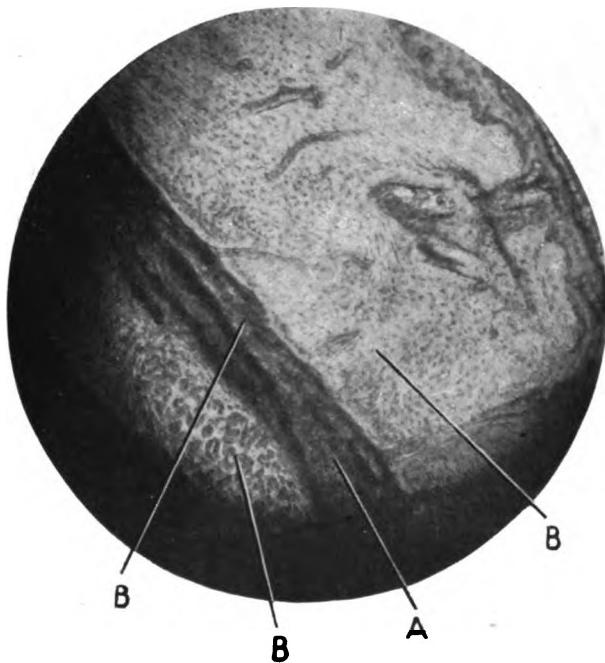


Fig. 6. Longitudinal Section of New Bone—in Spiral.
(a) Fibrous tissue. (b) New bone.

wire implanted into holes made with a bone drill. Studied the growth of new bone under various conditions and the effect of trauma upon bone due to instrumentation in the various operations. He has transplanted sheep and pig's tooth roots in the human jaw, the pig's roots giving every evidence of permanency.

Experiment 1. Fox terrier about a year old, April 19, 1913, transplanted freshly removed sheep's tooth in mandible-right side. Tooth was lost on fifth day.

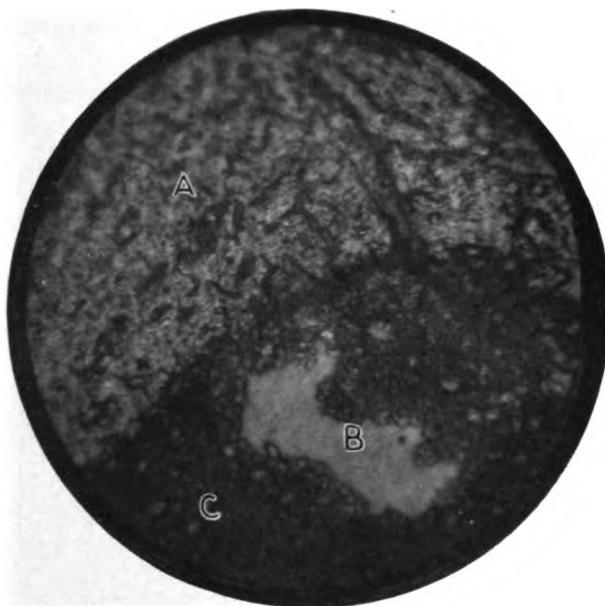


Fig. 7. Transverse Section of Bone Around Greenfield Crib.
(a) Healthy bone. (b) Space from which wire of crib was removed. (c) Degenerated bone cells around crib.

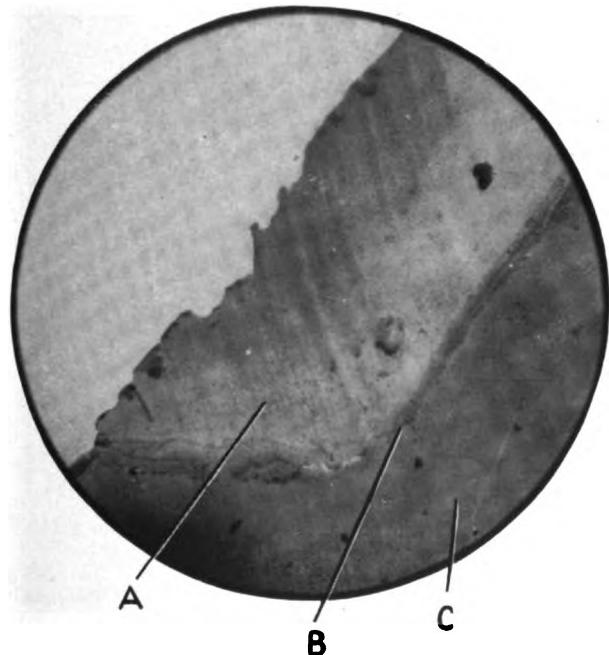


Fig. 8. Transverse Section of Pig's Root Nursed upon the Blood of the Dog.

(a) Dentine. (b) Peridental membrane. (c) Bone.

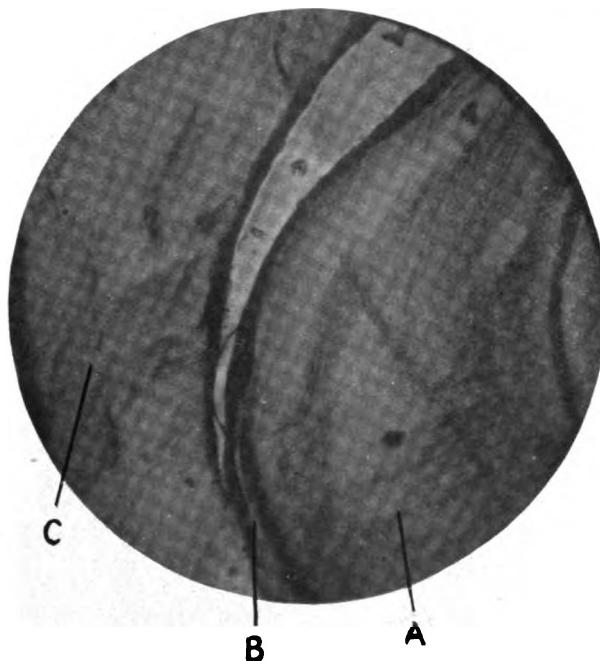


Fig. 9. Transverse Section of Homogenus Root.
(a) Dentine. (b) Peridental membrane. (c) Bone.

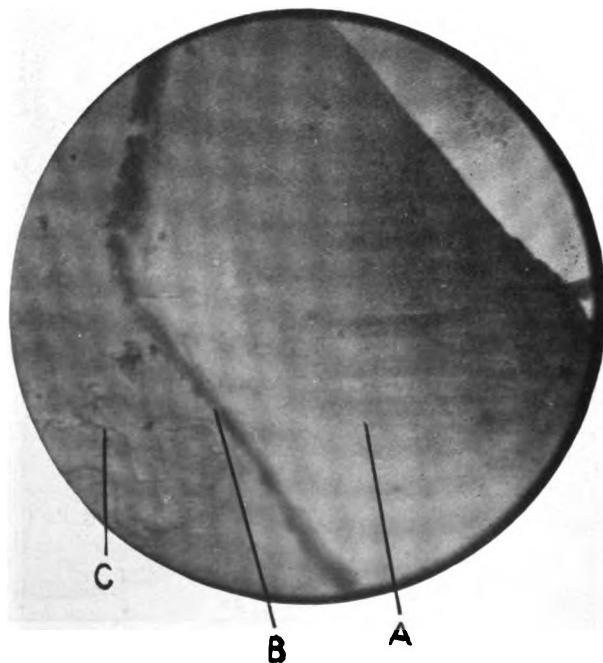


Fig. 10. Transverse Section of Autogenous Root.
(a) Dentine. (b) Peridental membrane. (c) Bone.

Transplanted a small tooth root from a healthy, freshly extracted human third molar in left side of dog's mandible. Root lost between twelfth and fourteenth day. Implanted after Greenfield's method an iridio-platinum crib in natural space distal to upper right cuspid tooth. The crib was lost between twenty-eighth and thirtieth day—probably due to rarifying osteitis. Implanted iridio-platinum spiral in natural space distal to upper left cuspid tooth. Hole was made with bone drill—no lubricant used. Spiral encapsulated in sequestrum was

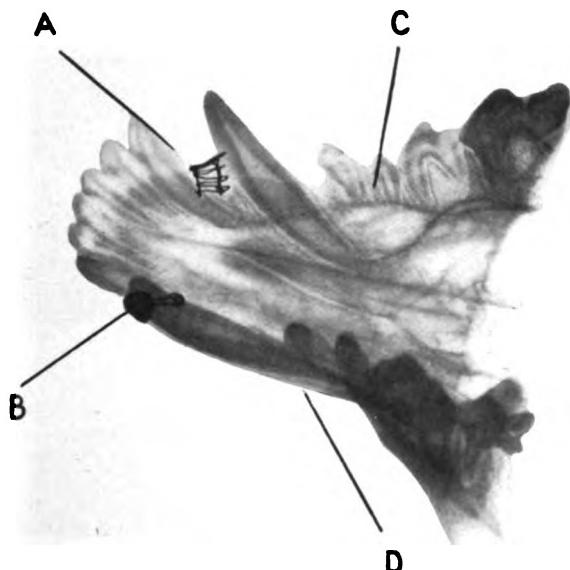


Fig. 11. Radiograph of Upper Jaw—Experiment 4.

(a) Greenfield crib. (b) Platinum iridium spiral. (c) Sheep root nursed upon the blood of the dog. (d) Sheep root not nursed upon the blood of the dog.

exfoliated on fourteenth day. Lower left bicuspid was transplanted into the socket of upper right bicuspid—upper right bicuspid vice versa. Same operation was repeated on lower right and upper left bicuspid tooth. Lower left transplant was lost on third day. The other three teeth were retained and held firmly in the socket on the forty-eighth day, when animal escaped, thus preventing postmortem observation.

Deductions from Expt. I. The foreign grafts, that is, the sheep and human roots, were lost on the fifth and twelfth days, respectively; whereas with the autogenous grafts (the dog's teeth), of the four, three were retained.

Your essayist assumed that in the three retained teeth the peridental membrane remained vital, inviting tissue adhesion, and lived. In the

case of the other teeth the periodontal membrane died; there being no appreciable inflammation, the tooth being retained by mechanical force only (as a foreign body), was exfoliated owing to a rarifying osteitis in the surrounding bone tissue.

That the autogenous transplants retain their vitality, while the heterogenous died, was in direct accordance with the experimental work of tissue transplantation by Carrell and other investigators. That the

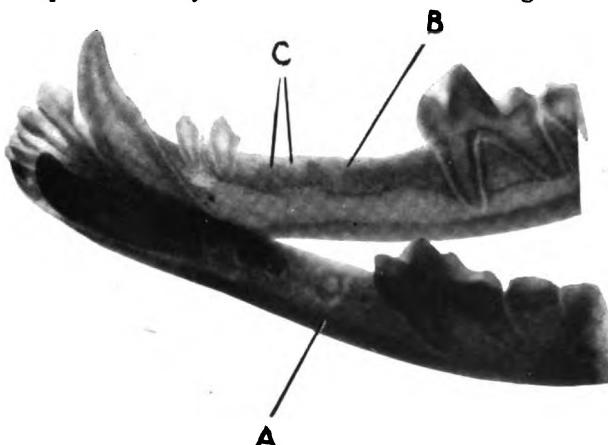


Fig. 12. Radiograph of Lower Jaw—Experiment 4.

(a) Drill hole where no powdered bone and vaseline was used. (b) Where drill hole was made using vaseline and powdered bone (note core of new bone). (c) Sockets from which teeth had been extracted.

autogenous lived while the alien tissue died proved that death was not due to the lack of available nourishment or blood supply, but rather to the inability of the tissue to assimilate the foreign nutrition. Acting upon this assumption, your essayist determined by graduating steps to culture or nurse the tissue to be transplanted upon the blood of the individual into whom the graft (tooth root) was to be introduced. To accomplish this your essayist made a bouillon of blood from the animal from which the graft (tooth root) was obtained and a bouillon of the blood of the individual into which the graft (tooth root) was to be implanted.

The root, after being carefully dissected under asepsis, *i. e.*, the mandible of a freshly slaughtered sheep or pig, is painted with iodine and wrapped in sterile gauze, exposing only the incisor region. The crowns of the teeth are removed from the roots by drilling through below the gingival border, the freshly exposed area is painted with iodine and the mucosa dissected away from the bone—the exposed bone is painted with iodine—a fresh sterile set of instruments is then employed—the bone carefully chiseled away until the roots are well exposed. The

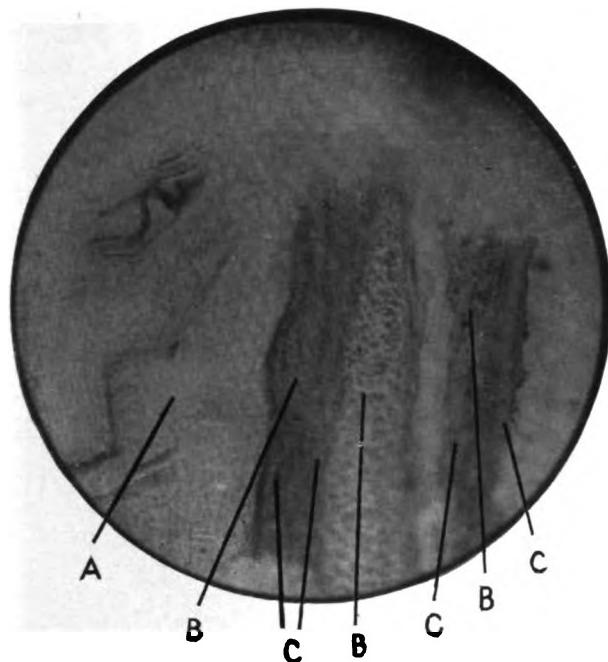


Fig. 18. Longitudinal Section of Bone in Spiral.
 (a) Bone. (b) New bone forming within the fibrous tissue. (c) Fibrous tissue.

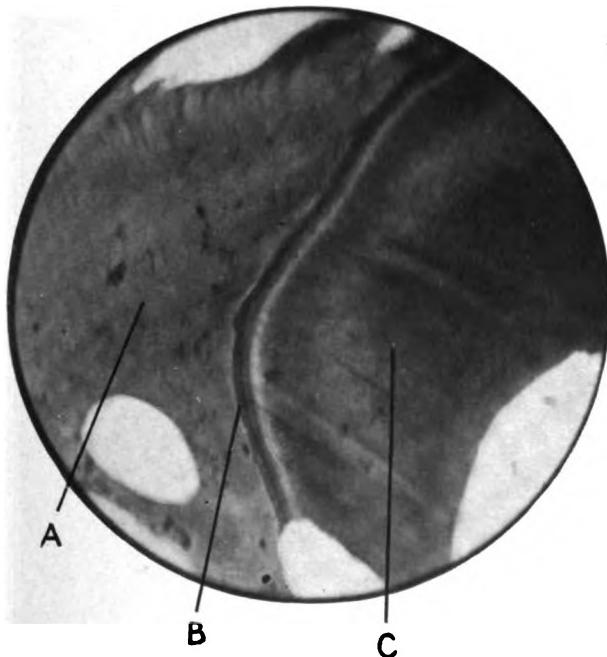


Fig. 14. Transverse Section of Sheep Root Nursed upon the Blood of the Dog.
 (a) Bone. (b) Peridental membrane (note co-apatation of root and bone).
 (c) Dentine.

Items of Interest

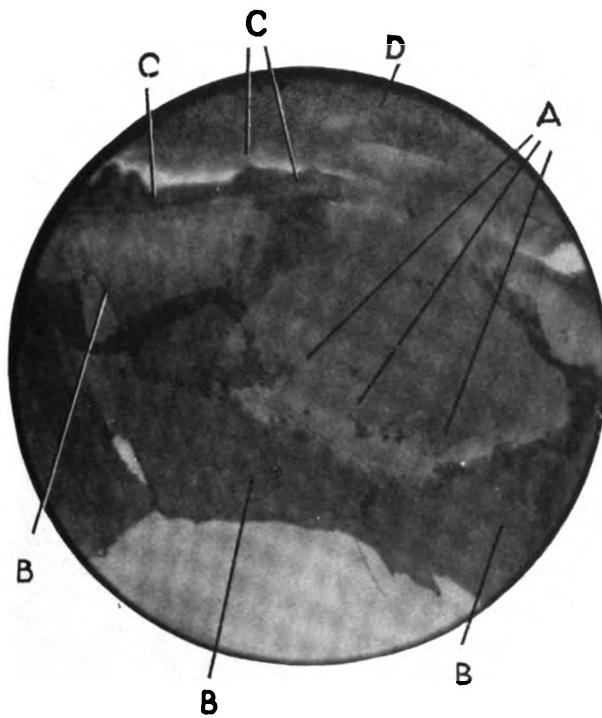


Fig. 15. Transverse Section of Sheep Root not Nursed upon the Blood of the Dog.
 (a) Fibrous tissue growing into a bay of absorbed dentine. This section may explain how a root can become ankylosed into a socket. (b) Dentine. (c) Peridental membrane.

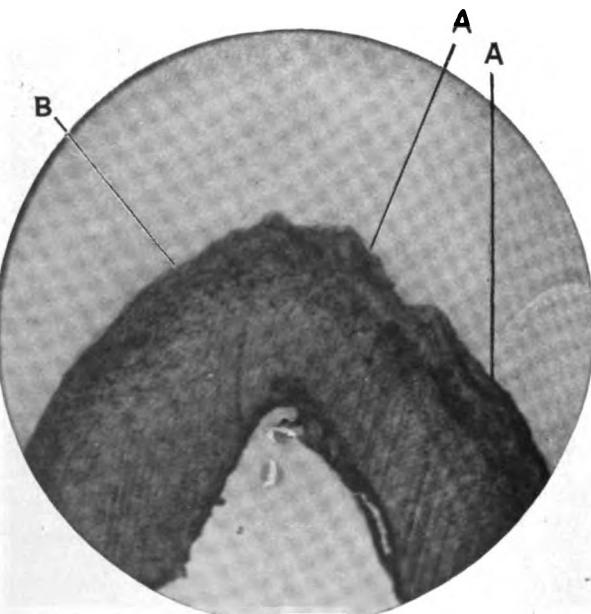


Fig. 16. Transverse Section of Sheep Root which has been nursed upon the blood of the individual (upon the mesial side only) and then implanted. Root was extracted on 90th day—section shows;
 (a) Peridental membrane on mesial side was vital.
 (b) Peridental membrane on distal side (which was not nursed upon blood of individual shows degeneration and numerous osteoclasts).

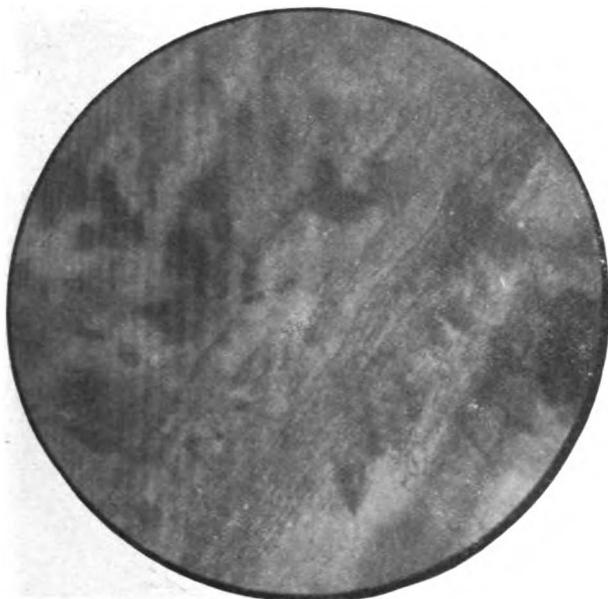


Fig. 17. Same as Fig. 16
—Under High Power—
Section from side of
Root not Nursed Shows
Decalcification of Dentine.

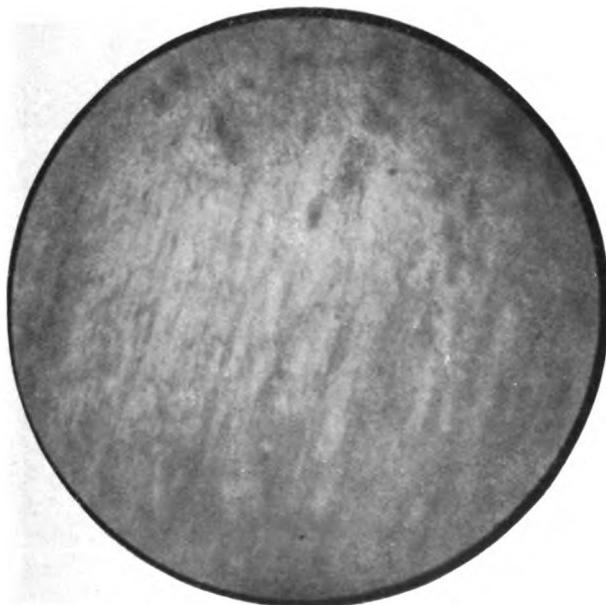


Fig. 18. Same as Fig. 16
—Under High Power—
Section from side of
Root Nursed upon the
Blood of the Individual
—Shows Normal Dentine.

roots are removed with the periodontal membrane intact. No instrument should be allowed to come in contact with more than one root, as any root, being unsterile, would then contaminate the others. Even under these extreme precautions your essayist has only been able to obtain about twenty-five per cent. of sterile roots. These are then placed in separate test tubes, each containing a normal saline solution with ten per cent. of the autogenous bouillon. At the end of six hours a bouillon

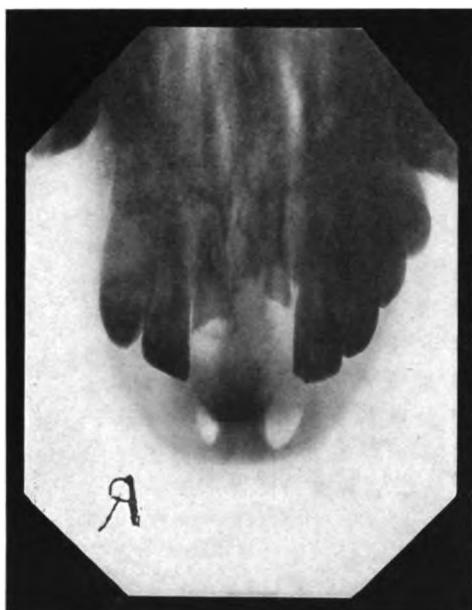


Fig. 19. Sheep and Pig Root Implantation in Human Jaw. Radiograph Taken One Month After Implantation. Right Central is Pig Root, Left Central Sheep Root.
Fig. 20. Same as Fig. 19 Taken Four Months Later. Patient Presented.

to the amount of two per cent. of the individual into which the root was to be transplanted was added. This was repeated every six hours until twenty per cent. by bulk was attained. A culture was then made and, if negative, the root was transplanted and invariably retained.

The formation of a sequestrum around the spiral is in direct accordance with the findings of surgeons when drills have been employed in bone work. This phenomenon is generally attributed to heat produced by friction when drilling. To overcome this, cold water is employed by the surgeon while operating.

If success was to be obtained in transplanting roots in freshly drilled sockets, your essayist recognized that the drilling must be accomplished without injury to the bone tissue and decided to continue research to this end.

A piece of dog bone was dried, broken up into powder and incorporated in vaseline, to a consistency of a thick paste. In later implant

experiments this was used upon the drill, which was also chilled with an ethyl chloride spray while drilling, with the result that we never had a sequestrum form when this technique was followed. The vaseline reduced the friction while drilling, and it was found that the powdered bone encouraged the growth of bone by becoming a focus for the rapid development of new bone.

Your essayist also recommends the use of powdered bone in vaseline in the treatment of bone fractures, introducing it hypodermically into and between the fractured ends; also wherever new bone is desired, such as the restoration of alveoli restored by pyorrhea. His experiment has shown that the powdered bone encourages calcareous deposits and a metaplasia of adjacent tissue cells into bone.

Bull terrier about a year and a half old, Sep-

Experiment 2. September 18, 1913. Transplanted a small root of healthy, freshly extracted human third molar tooth in space (Fig. 1, A) between bicuspid teeth on lower right side (no lubricant used—drill chilled). Implanted platinum iridium crib (Fig. 2, B) in space distal to upper right cuspid (no lubricant used). Transplanted root from freshly slaughtered sheep into space distal to upper left canine. This root was transplanted immediately from the sheep's jaw to the dog's. Vaseline and powdered bone employed. A root from the same sheep's jaw, which had been nursed upon the blood of the dog, according to your essayist's method just described, was transplanted into space distal to upper right cuspid of the dog's jaw on September 22, 1913. Vaseline and powdered bone employed. Animal sacrificed October 16, 1913 (twenty-eight days). The transplant of the human root in lower right side was almost completely absorbed (Fig. 1, A). Here no vaseline and powdered bone were used—the root was encapsulated in a sequestrum of bone about to be exfoliated. The platinum crib implanted in upper right side was about to be exfoliated (Fig. 2, B). It was also partly encapsulated in sequestrum of bone. The sheep root, which was transplanted directly from sheep's jaw to dog's, was lost on the twelfth day; whereas the root that had been nursed upon the blood of the dog was retained (Fig. 2, A). Microscopic sections (Fig. 3) show a physiological coaptation. There was no apparent inflammation of the adjacent tissue. The iridio-platinum crib, as stated, was about to be exfoliated—partly encapsulated in sequestrum.

Mongrel collie about two years old, April 19,

Experiment 3. 1914. Implanted iridio-platinum crib after Greenfield's method in space anterior to upper left canine tooth. Implanted in space anterior to upper right canine—iridio-



platinum spiral. Vaseline and powdered bone used on drill—also ethyl chloride spray. Transplanted on right side distal to canine tooth, freshly removed pig's tooth root. Transplanted on left side, tooth root of a pig nursed upon the dog's blood according to the technique described. Drilled hole in lower jaw bone, distal to right cuspid tooth, using no vaseline nor powdered bone on drill. Drilled hole in relative space on left side, using vaseline and powdered bone on drill—also filling hole with vaseline and powdered bone—sutured the mucosa over each drill hole, using horse hair suture. On May 3, 1914, transplanted tooth from another dog into socket of freshly extracted upper right first bicuspid. This upper right bicuspid was transplanted into socket of freshly extracted upper left first bicuspid. This was done to observe whether autogenous tooth roots were retained better than homogenous roots. However, in this case, both teeth were retained and apparently equally firm. Animal sacrificed May 31, 1914 (forty-two days).

There was marked degeneration of bone around the Greenfield crib (Fig. 4, A and Fig. 7). The core had almost entirely resorbed. The platinum iridium spiral implant (Fig. 4, B) was retained in a healthy area of tissue, the drill hole being almost completely filled in with new bone (Figs. 5 and 6). The pig's root, which was transplanted directly from the pig to dog, was lost, while the pig's root (Fig. 8) nursed upon the dog's blood was retained.

There was little to choose between the autogenous (Fig. 4, C) and the homogenous (Fig. 4, D) transplants; both were retained (Figs. 9 and 10). In the drill holes in the lower jaw, on the left side, where vaseline and powdered bone were used, there was a complete filling in of healthy bone. On the right side, where no vaseline nor powdered bone were used, the hole was almost filled.

White fox terrier about year and half old, May

Experiment 4. 3, 1914. Implanted Greenfield iridio-platinum crib in space distal to upper right cuspid, using vaseline

and powdered bone. Implanted iridio-platinum spiral in space distal to upper left cuspid tooth; used powder and bone. Transplanted distal to upper right canine, a freshly extracted dog's tooth, from which the peridental membrane had been removed. Transplanted in socket of freshly extracted upper right second bicuspid, a sheep's tooth root, nursed upon the blood of the dog. Transplanted in socket of freshly extracted upper left first bicuspid, root of sheep freshly removed from animal and not treated upon the blood of the dog.

In lower jaw, extracted on the left side two teeth to see if socket would heal more readily than where hole was drilled just distal to these sockets and filled with powdered bone, using vaseline and powdered bone

on drill—sutured mucosa over drill holes with horse hair sutures. Right side, drilled hole relative to drill hole on left side, using no vaseline or powdered bone. Sutured mucosa over hole with horse hair sutures. Animal sacrificed May 31, 1914 (twenty-eight days). There was less resorption of bone around the Greenfield crib (Fig. 11, A) than in the other Greenfield experimental implants, probably due to the use of the vaseline and powdered bone. There was no sequestrum; however, the crib was not held firmly in the jaw bone. The spiral implant (Fig. 11, B), although not firmly attached, was being retained in a moderately healthy tissue area. Transplant of dog root, denuded of peridental membrane, was lost on twelfth day. Sheep's root (Fig. 11, C and Fig. 14) that was nursed upon the blood of the dog was retained, and in coaptation with healthy surrounding bone tissue, while sheep root not nurtured upon the blood of the dog (Fig. 11, D and Fig. 15), although retained, was not in coaptation with surrounding bone tissue.

In the lower jaw, on the left side where teeth were extracted (Fig. 12, C), sockets had partly filled, while drill hole which was filled with powdered bone (Fig. 12, B) had entirely filled with healthy new bone.

On the right side (Fig. 12, A), where no vaseline or powdered bone were used, drill hole was an empty space, surrounded by a sequestrum of degenerated bone.

Your essayist found that, whereas metal was

Conclusions. retained in jaw bone, the bone tissue did not take kindly to it; that roots denuded of peridental mem-

brane were exfoliated; that autogenous and homogenous tooth roots with peridental membrane upon them were retained; that the alien tooth roots not nursed upon the blood of the individual into whom they are transplanted are lost (except in one instance, where the sheep tooth root was retained, but only mechanically); that alien grafts (tooth roots), when nursed upon the blood of the individual into whom they are transplanted, are retained; that powdered bone incorporated in vaseline, when introduced into tissue, invites calcareous deposits and the formation of new bone; and, best of all, that the possibility of transplanting alien tissue is no longer in doubt.

I am indebted to Dr. W. H. Stewart for the X-rays.

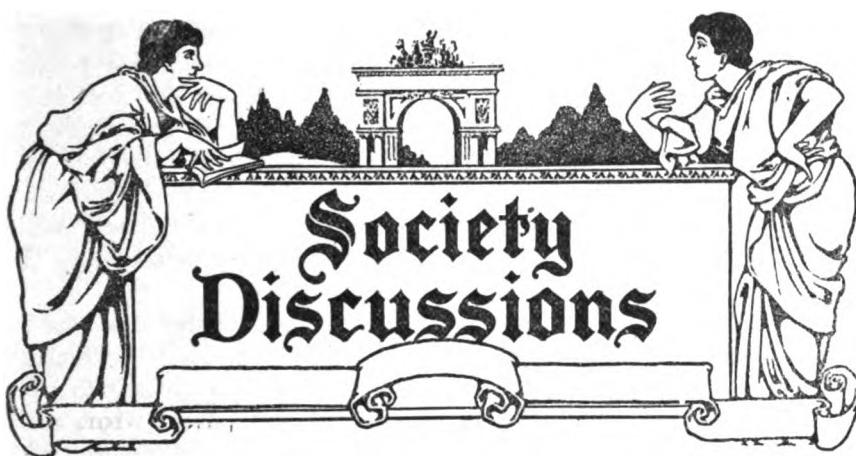
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Forty-Fourth Annual Meeting of the New Jersey State Dental Society.

(Report of Wednesday Evening Meeting Continued)

President Gelston. Dr. Fowler, chairman of the Essay Committee, will introduce the essayist of this evening.

Chairman Fowler. We have been successful in bringing before the society to-night an essayist and a subject that will be of importance as one of the live topics to come up before the convention. We have selected for this evening as that essayist, Dr. H. J. Kauffer, D.D.S., of New York City. Dr. Kauffer has been carrying on experimental work in perhaps a different line from the ordinary Root Implantation experiments and he will explain these experiments fully.

He has a patient who is carrying some experimental work in his mouth and this gentleman is present to-night. Dr. Kauffer wishes to present him at this time.

(Dr. Kauffer presented a patient with an implanted root and invited everybody in the room to examine the work.)

Dr. H. J. Kauffer. I regret that I should interrupt this meeting to present this patient at this time, but he has been kind enough to come from New York to be present here to-night and must get the 9:30 train back, which accounts for the interruption. This patient has had implanted or transplanted, according to my technique, a tooth root which I will describe in my paper. It is an operation by which a pig's tooth root is supporting the porcelain pivot crown.

The two upper centrals were lost in an accident about fourteen years ago and he had no teeth in the gap during that time. He became interested in my work, and I am indebted to the patient also for taking care of my dog, at the institution where I have done my research work, which he saw and which was the incentive to him to submit to this operation. He thought so well of it that he wanted some roots in his own mouth. If any of you gentlemen would like to see this case I would ask you now to step forward and examine the patient's mouth. (The patient was then examined by those in the room.)

Gentlemen, you have seen, in this case, one of **Chairman Fowler.** those wonderfully successful operations in which an alien tooth root was implanted in the mouth of a human being. It is one of those remarkable operations of which there are very, very few successful cases. Dr. Kauffer will now proceed with his lecture. (Dr. Kauffer's paper appears in this issue.)

Discussion of Dr. Kauffer's Paper.

Dr. Joseph Kussey. Mr. President and gentlemen, the question that arises primarily in a discussion on this valuable contribution to our profession is: Has the essayist a right to assume that the periodental membrane remains vital in his experiment, and if so on what is this assumption based? We have records of implants and replants that have been retained for ten years and more without so much attention to detail in the preparation thereof as the essayist has pursued. The use of powdered bone and vaseline as a lubricant and for the purpose of stimulating osteogenesis is, I believe, a valuable procedure. Schroeder, of Berlin, advocates the use of tri-basic phosphate made into a mass for a similar purpose.

The weakness of the essayist's paper lies, essentially, in the fact that such a short time has elapsed for the formation of any reliable opinion or positive statement as to the results achieved. The question and the thought that comes to us, however, as we listen to a presentation such as we have heard this evening is that we are standing upon the threshold of a new era. The dental profession is no longer one of mechanical ingenuity or mechanical practice only. Nowadays there are marks of paths before untried and unbeaten—of delving into the hidden mysteries of science; the relationship of dental application to systemic disease; the chemical nature of the salivary secretions; the anatomical instructions in prosthesis and now the surgical replacement of lost dental organs are opening new fields. It is due, largely, to this awakening that here in New Jersey the dental profession has been elevated for the first time, and may we trust for all time, to that high plane so long occupied and monop-



olized by our medical brethren. The Academy of Medicine of Northern New Jersey, an organization of the representatives of the highest type of men, with a membership embracing some of the most prominent men in the medical profession in the East, at a recent meeting altered their by-laws by unanimous vote to admit dentists to the Academy with all the rights of fellow membership. May we not be unmindful of that action. May we rather by a continuance in the path of scientific research and by our best efforts at all times toward the alleviation of human suffering and pain and the betterment of the public health teach all other such organizations throughout the length and breadth of this great country that not alone shall we be worthy of their confidence, but that they, as well as we, must profit by these alliances.

As regards Dr. Kauffer's work we have been connected with it very closely, and your society **M.D., New York City.** should be complimented on having his first paper on this subject. From what I have seen of it I congratulate Dr. Kauffer very highly upon his success so far and for what he has attained.

I have listened to Dr. Kauffer's paper with a great deal of interest. He has brought before you a subject that is of vital importance to the dental profession. The members of the profession have been working for years on this problem and for this once they have arrived at some method whereby roots can be inserted, roots of pigs and other animals, to take the place of the undesirable plates which have been in use heretofore. We have had considerable experience during the past two and a half years with implanting of platinum roots. At the present time I am carrying on research work along this line and in the near future I hope to have something to present to the dental profession which, I think, will be of great interest. We have implanted a large number of Greenfield roots and I have seen a number of cases that were not successful. However, I have had a number of cases, up to the present time, that are a success. I have one in my own mouth that was implanted one year ago before the State Society of Connecticut.

This root has never given me any pain whatsoever. I was very much impressed with Greenfield's system when it was first presented to the members of the dental profession, but after using it extensively I was not so enthusiastic over it. In my own case, for instance, we have been very careful and took radiographs every two months to compare the changes that have taken place. As you know, in the Greenfield implanting method we have a center core. In my own case I find, after three months, that there was no absorption of the center core. At the end of

three months the tip of that core began to absorb. Four months ago the radiograph showed that the regeneration of the center core was taking place. Last week, at the National Society at Rochester, it showed the center core as regenerated a great deal, which we determined by comparing it with the radiographs taken previously. I have abandoned the Greenfield system altogether and I am glad to say that I have devised a system with which up to the present time I have met with great success. As Dr. Kussy said in his discussion, Dr. Kauffer cannot be positive about the practicability of his method in such a short time.

In regard to the system which I have devised, I do not know that I want to make a statement; I could not make it and say that it is a complete success. We are trying to improve the methods and hope to stumble on some plan whereby we can do this work with complete satisfaction and with which we can claim that our work will be a success. I have implanted something over forty, and two of them, to my knowledge, were a failure. I started to do this work last fall and I appreciate that we cannot draw our conclusions or base our success or claim absolute practicability in such a short time. In ten years from now it will be a different proposition.

With your permission, in closing I will cite one or two cases of particular interest. Last month I implanted a right upper cuspid for a patient sixty years of age, for Dr. Bell, of Ashtabula, O. There were three roots. In order that the doctor could insert a fourteen-tooth bridge the cuspid was inserted. Dr. Bell presented this operation to the National Dental Association in Rochester. To-morrow, in my clinic before your society, I will present to you numerous radiographs showing how these roots have been inserted. I have slides of radiographs showing roots that Dr. Greenfield implanted eight years ago and Dr. Greenfield tells me that these roots are still in the patient's mouth. If any of you gentlemen would like to see the root that I have had inserted in my own jaw I will be glad to exhibit it to you. It has been in for one year and it has never hurt me a particle.

Mr. President, I might report a case of replantation. **Dr. Charles F. Jones.** A boy ten years of age had an accident and the tooth was lost for about six or eight hours, after which it was finally brought to my office and I sterilized the tooth and removed the pulp and filled the root canal and then sterilized again and replaced it back into the socket. I applied a small splint, cemented that in position and allowed it to remain for two months. That was inserted about the first week in January. At this time that is in position and thoroughly firm. Next year I hope to present that case to the convention with radiographs.



Dr. Kussey tells us that this work is unproved.

Dr. B. J. Kauffer. In ten years I would like to show you some results, which I know will develop, and assure you positively that it is a success; but a great deal of time would thus be lost if we waited ten years before submitting this to the profession. Greenfield agitated his method of root implantation and I wished to investigate and be sure as to whether it was a success. As I have shown you with my method, I worked along scientific lines. Dr. Kussey, I assumed, that the periodontal membrane remained vital before I made my sections. I now believe that if the membrane remains vital we will have the tooth root implanted, successfully retained. If we can by nursing this tissue on the blood of the individual retain the vitality of that membrane we are positively going to have the retention of that root if there is a coaptation of tissue. There are reports of cases of transplantation of teeth that have held. They have been retained from six to ten years, and if we get that result "of tentative preservation," as Dr. Schroeder says, it is well worth while.

Dr. Hassler tells us that with the Lane plates he believes that we have only fifty per cent. complete success. I do not question that for a moment, because I do not believe that metal will stand stress under such conditions, and that these plates do need to be removed. I simply stated that it is said that Lane has only four per cent. of failures, and Dr. Thomas, as I said in my paper, assumed that he does have more than four per cent. As for metaplasia of connective tissue into bone, Dr. Bancroft, in a paper published in the *Journal of Medical Science* last month, showed a case of this kind.

Dr. Smith tells us that he has abandoned the Greenfield system. I know that he has done a great deal of work with the Greenfield crib, and "that the core has been retained for a certain period of time," and I do not question that for a moment. However, in the Greenfield technique there is a large quantity of paraffine used that is not absorbed and must remain (and Dr. Greenfield does not use any lubricant on the trephine), he is bound to have a resorption of the core, even if there is no stress.

Dr. Smith has told us about a crib in his own mouth. I would like to have Dr. Smith tell us whether there is a crown on this crib or not.

No, there is no crown on the root. Dr. Kauffer.

Dr. Smith. That is different. With a crown it cannot be retained. Will it withstand the stress and support the action of mastication?

Moved that a vote of thanks be tendered to Dr.

Dr. Fowler. Kauffer for his very interesting paper. Motion seconded and carried. Adjourned to meet Thursday morning at 10 o'clock.



The Forsyth Dental Infirmary for Children and the Work Which it May Accomplish.

The opening of the Forsyth Dental Infirmary for children marks an epoch in dental history, from which we firmly believe will be dated a revolution as to the appreciation of the importance of dental caries and mouth hygiene in relation to general health, as well as in the responsibility of municipalities toward children of school age.

In a splendid and illuminating address made at the dedication, Mr. Edward McSweeny, Trustee of Boston Consumptives' Hospital and Chairman of the Port Directors, Boston, made certain statements which seemingly open a most important discussion, which for the benefit of the children of this country should be conducted dispassionately.

Mr. McSweeny tells us that in the school year 1912-1913 there were 122,459 defects among the school children of Boston, and that 80 per cent. of these centered in the mouth and teeth. He then says:

"With the establishment of this infirmary, so wisely conceived and so patriotically carried out, the community can feel assured that every child in the Boston public schools will have all possible defects remedied before leaving school; and consistent with incurable physical limitations, these children will have a straight road from their education into their chosen paths of life."

This in effect means that all the defective teeth of the children in the Boston public schools can be cared for in the Forsyth Dental Infirmary. This is a pleasant prophesy on the part of Mr. McSweeny, but unfortunately, if, as we understand to be the case, the Forsyth Infirmary



is to be conducted as a curative clinic, this prophetic vision can never become a realization.

Fortunately, however, the building itself is so constructed and equipped that, in time, this single institution might well care for all the teeth of Boston's school children as rapidly as they might need attention, provided that the proper course be pursued. More fortunately still, it is the writer's firm belief that the present directors of the Forsyth Dental Infirmary are men of such broadness of mind and of such capability that just so soon as it may be shown that more can be accomplished with a plan other than the one first to be tried, they will put into force the alternative method of managing the institution in order that the great gift of the Forsyths may achieve the highest good for the largest number. Putting aside, therefore, all personalities, and admitting that no plan has yet been fully shown to be the best, let us fairly analyze the task which is to be undertaken.

**The Extent
of Caries
in Schools.**

Dr. William J. Gallivan, Commissioner of Health and Chief of the Bureau of Child Hygiene for Boston, in his address states that school inspection shows that 46 per cent. of the school children

have defective teeth. Dr. Gallivan is a physician, and in the same address tells us that medical inspection of school children was first inaugurated in Boston, and that the defects in teeth were found to be so numerous that "school physicians were required to record defective teeth." It would seem, therefore, that this estimate of 46 per cent. defectives is based upon tooth examinations made by medical examiners. If this examination and the resultant statistics were correct, it would mean that 54 per cent. of the Boston school children have sound teeth, which no dentist with the least experience in such matters would believe.

Dr. Ward Crampton, Director of Child Hygiene for the City of New York, has expressed the opinion that 80 per cent. of school children in New York City have four or more decayed teeth. Similar statistics have been compiled in other cities. It cannot be very different in Boston.

If Mr. McSweeny bases his statistics on Dr. Gallivan's percentages, it is manifest that he has told but half the truth, and we may be sure that in actual practice the task will loom much larger than his figures would

lead us to expect. With this fact, which is a fact, clearly in mind, let us accept his estimates and see just what it is that he thinks the Forsyth Dental Infirmary can accomplish.

He tells us that (in round numbers) there are 122,000 defective children in Boston, 80 per cent. being tooth defects. This means that 97,600 Boston school children have defective teeth. Accepting Dr. Crampton's estimate of four each, that means that there are at present 390,400 carious teeth in the mouths of these school children.

How many of these shall we allot to the Forsyth Dental Infirmary?

The writer once asked Dr. Ward Crampton this question: "If the municipality should pass a law making it compulsory that children's teeth should be cleansed once a month, and supplied trained nurses to do the work in the schools, what proportion of the parents would have the work done in private offices?" His reply was illuminating. He said in effect:

"Of course, it is hard to tell accurately. But my experience is that the parents will acquiesce in any regimen the school laws require. I think if we had a dental infirmary, with nurses cleansing teeth, not over ten per cent. of the children would go to private dentists for their cleansing, and if we likewise had infirmary dentists filling teeth free, not over twenty per cent. would have their children's teeth filled outside of the school infirmary."

The above, of course, is purely speculative, but it comes from a man of vast experience. Moreover, it should not be forgotten that the children of the very rich go to private schools. It is fair, then, to presume that eighty per cent. of the 390,400 carious teeth in Boston may be allotted to the Forsyth Dental Infirmary in this study of the problem. This means 312,320 to be cared for in the first year.

**The Resources of
The Forsyth
Dental Infirmary.** To meet this problem and fulfill Mr. McSweeny's promise to Boston's school children, what resources will the Infirmary have? There are to be at the outset 15 operators working 7 hours per day (presuming that they have one hour for luncheon), a total of 105 hours; 60 working 4 hours each, a total of 240; and 15 working two hours each, a total of 30 hours, or a grand total of 375 hours.



Add to this 25 hours daily by the visiting staff and we have 400 hours of work accomplished daily by the operators of this institution.

Deducting 52 Sabbath days and eight yearly holidays, we have 305 working days for the infirmary. As there are 312,320 teeth to be filled annually, the infirmary must fill (in round numbers) 1,000 teeth in each day, working 400 hours per day. Can the infirmary do this?

When the full complement of 110 chairs are in place, and with an operator at each for full time, we would even then have but 700 hours per day in which to care for 1,000 carious teeth.

**The Writer's
Personal
Experience.**

It may seem to some that 1,000 children's teeth may be filled in 700 hours. Let us therefore recount a personal experience. The writer during 1912-1913

was one of a committee of 80 men of the Second District Dental Society, who took care of school children in their private offices. He received and treated three children, giving Saturday afternoons from 2 P. M. to 5 P. M. to the work for six months.

Problem: If it required six months, working half a day per week for one dentist to care for three children, how many dentists would be needed, working seven hours, to fill 1,000 teeth in one day?

For these three children exactly twelve teeth were filled. Each child also had prophylactic treatment one hour each month. Thus there were eighteen hours devoted to prophylaxis, and the actual time spent on treatment and filling amounted to thirty hours for the twelve teeth. Four of these teeth presented pulp exposures and required pulp removal, with radiographic checking up to prove the work correctly done.

It is not here claimed that this estimate of approximately two and one-half hours per tooth would maintain throughout an entire year's experience in a public dental infirmary, since all these teeth were filled with gold inlays; nevertheless, it seems fair to estimate at least one hour per cavity.

At this rate it is seen at once that the task set for the Forsyth Dental Infirmary by Mr. McSweeny is a hopeless one, and moreover *we have not reckoned a single hour for prophylaxis*, but have devoted the entire time of all the operators to curative work. Is it not manifest then that this institution, wonderful as it is, cannot wipe out the ravages of caries and

at the same time insure mouth hygiene for the school children of Boston if conducted as a curative clinic?

We may as well at once discuss one of the most important problems in relation to treatment of children's teeth. What is to be done in a dental infirmary with teeth in which the pulps are exposed, or dead and diseased? The men who are teaching and preaching, for preaching it amounts to, the correct method of doing root canal work, are demonstrating that it requires the highest skill, coupled with patience, perseverance and free use of radiography. Behind these are marching numerous dental and medical investigators who are proclaiming, aye, and proving, that faulty root canal work produces root-end infection, which in turn causes systemic infection, followed by organic disease and even death. What then is to be done with these teeth when the child is brought to the infirmary? Shall they be properly filled, and the correctness of the work proven with a radiograph, in spite of the skill and time required? Or shall these root canals be indifferently filled, leaving the child to possible future systemic disturbance? The answer is not readily found; yet if the latter course be pursued, hopeless must be the effort to combat disease through dental attention, and we might as well haul down our banners and erase the words "Prophylaxis" and "Mouth Hygiene."

**Prophylaxis
and the
Dental Nurse.**

At the outset the writer declared that there is a plan whereby the Forsyth Dental Infirmary can accomplish all that the founders have hoped and all that Mr. McSweeny has prophesied. And the hint of the solution is contained in the words "Mouth Hygiene" and "Prophylaxis." Told quickly, it comes to this: Let every school in Boston be supplied with properly trained dental nurses, whose duty it shall be to cleanse the teeth of the children once a month, and to train them in mouth hygiene, at the same time noting and charting incipient caries. The Forsyth Dental Infirmary could then readily fill all the cases of caries as fast as discovered. This, of course, cannot be accomplished in a single year, but the plan can be worked out so as to practically eradicate caries and more especially foul mouths, exposed pulps and abscessed teeth within ten years. Would this be worth while?



The plan in detail is as follows: Abandon at once the hopeless undertaking of filling teeth for all the school children of Boston. Last year Boston had no such infirmary; the children who already have decayed teeth will therefore be no worse off now than they were then, if the infirmary should not undertake the filling of their teeth.

Add to the present dental staff of operators fifty or sixty women, who shall constitute the first class of trained dental nurses.

Limit the work of these women during this first year of training to operations upon the infant classes. These youngsters, having few if any permanent teeth, can suffer little harm from these women in training, less harm, surely, than the patients in hospitals attended by undergraduate nurses. Let these dental nurses, after graduation, be given chairs in public school buildings, where they could continue the prophylactic work on the same children, now one grade higher in their school work, and let a new class of nurses be received into the Infirmary Training School. Then year by year more and more nurses could be trained by the Forsyth Infirmary and sent into the school infirmaries, and by the time when the first children thus treated are ready to enter high school, they will do so with practically clean mouths; with teeth, when filled at all, filled with small fillings; with all or nearly all teeth having sound, living and healthy pulps; with no abscessed teeth present; with trained prophylactic dental experts, caring for the mouth hygiene of all children to the top of the grammar grade; with all children entering high school thoroughly appreciative of the value of sound teeth and skilled in the care of them. Then would the Forsyth Dental Infirmary easily be able to care for the cavities in children's teeth as fast as their own graduate dental nurses would find and report them. Then would the problem have been solved.

Correction, with Apologies to Dr. Buckley.

It is with extreme regret that we must call attention to and apologize for a most unfortunate blunder in the last number of ITEMS OF INTEREST. In the report of the discussion of Dr. Buckley's paper, entitled "Desensitizing Paste. A New, Safe and Reliable Remedy for Hypersensitive Dentin," his closing remarks were made to include the following paragraph (page 939):

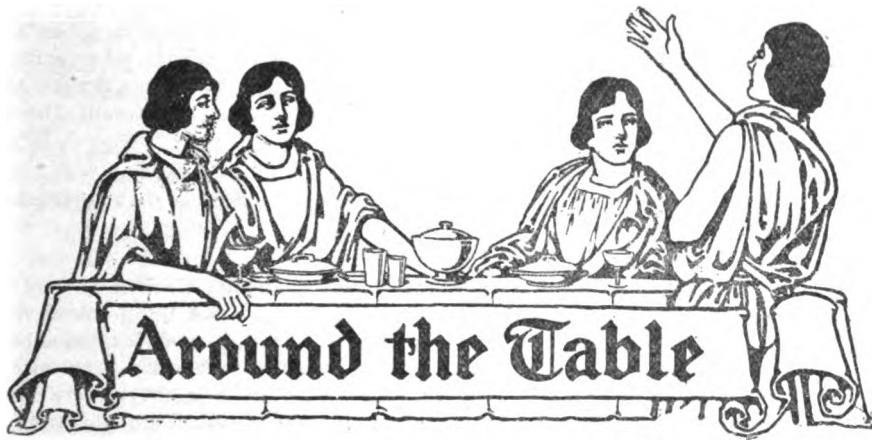
"Do you realize what it means? It means we can do better work and do it with more ease to our patients and ourselves. Our patients will no longer come to us with that intuitive dread of the dental chair that has always existed. We can conserve the vitality of our patients and of ourselves, and I believe that five years at least will be added to the active lifetime of every practicing dentist. I think I can safely prophesy this, and I believe the future will bear me out. It means also the passing of this present wave of enthusiasm which is sweeping over the country with regard to analgesia. We no longer need to give to our patients an anesthetic which will produce either partial or complete anesthesia, but can follow a saner line of procedure and one which is far safer in all cases. In conclusion, when the history of the dental profession shall have been written, I firmly believe that the name of Buckley will stand out conspicuously and prominently, and will properly be placed alongside of and with such names as Sir John Lister, Koch and Pasteur, and our own beloved Horace Wells, as benefactors of the human race."

All those who are personally acquainted with Dr. Buckley will recognize at once that such language never could have emanated from himself, as his arduous and valuable labors in behalf of the dental profession have always been coupled with the utmost modesty of manner, and no one could believe for an instant that he would prophesy that his name in future would be linked with those of Lister, Koch, Pasteur and Horace Wells, however true this prophesy may be. As a matter of fact, the paragraph should have been published at the end of the discussion of Dr. Hart J. Goslee.

Also we must note that on page 938 the formula for trioxmethylin is given as $(CH_2)_3$, whereas it should read $(CH_2)O_3$.

We again sincerely apologize to Dr. Buckley for the unfortunate misplacement of this matter.





I WAS DINING ALONE one night recently at the *Café des Enfants*, as we

- ❖ call it in the higher circles of society; but as some of you may not be
- ❖ in our set, let me explain that the common people know the place as
- ❖ Child's Restaurant. I was dining there because I was dining alone.
- ❖ When I have company, of course, I am compelled to eat at the Bilt-
- ❖ more, the Ritz Carleton or the *Café des Beaux Arts*; places where the
- ❖ waiter does not ask: "Will you have wine, Doctor?" but pleasantly ac-
- ❖ costs you with: "Doctor, which wine will you have." So when I
- ❖ am eating alone, I find it economical to patronize one of the Child's
- ❖ (not Children's) Restaurants, where the worst that the waiter dares to
- ❖ says is: "Coffee, with or without milk?" Milk, mind you, not cream!



TO GET BACK to my story, I was dining alone at Child's, or rather I was

- ❖ expecting to dine alone, but the Fates willed it otherwise. Did you
- ❖ ever approach a curb on a dark and rainy night? You naturally expect
- ❖ a lot of water in the drain right by the curb; so, to avoid wetting your
- ❖ feet, you take a long, long step, and you step completely over the dry
- ❖ place, and land ankle deep in a puddle? You have had the experience?
- ❖ Yes? I thought so. Well, that is how it was. I really passed right by
- ❖ the Knickerbocker, where they have a fine Grill, with good food, and
- ❖ where I have a favorite waiter; one you know who actually says
- ❖ "Thanks" when you give him a tip, and otherwise treats you like a
- ❖ human being, rather than just a common customer. As I was saying,
- ❖ I went right by the Knickerbocker, and went on and into Child's Res-
- ❖ taurant, just hoping to have a quiet, lonesome little meal, with no chance
- ❖ of meeting any millionaire dentists who would insist on talking den-
- ❖ tistry, or what they think is dentistry, when lo! And listen! What do
- ❖ you suppose? But let me tell you.



I HAD JUST received my two soft boiled eggs, and after removing the

- ❖ outer and inner peel, I was utilizing my strong right arm to mash the



Items of Interest

❖ edible parts sufficiently so that I could mix a little butter with the yolks and whites commingled as it were, or as they were not, but as every properly cooked soft boiled egg ought to commingle, when without the slightest attempt at eaves-dropping on my part, there floated to my ears across the fan-cooled atmosphere of that restaurant these sonorous words:



"THE TROUBLE WITH the editor of 'Items of Interest' is that he thinks
❖ he knows it all!"



NOW, HONEST! FOLKS, Cross my heart! Hope to die! That is not true.

❖ There are just oodles of things I don't know, and one thing that I do know, is that I don't know oodles of things. Now, just for instance, I don't know who made the war. But that isn't such crass ignorance, because very few people do know. But be that as it may, there are also loads of things right in and about dentistry, that I do not know, and would be glad to know.



OF COURSE I did not want to listen to that conversation, because you know

❖ what the book says that listeners always hear about themselves. Still, I must confess that I opened both ears and did listen. And it proceeded thuswise.



"OH! I WOULD NOT say that exactly." This from Man No. Two. "I

❖ guess he knows a few things at that." "Well I guess that you miss your guess," said Man No. One. "For instance what does he know about mechanical dentistry? Have you seen anything about mechanical dentistry in that Around the Table talk. Yes, you have, Not."



DON'T YOU SEE THE situation? Had hoped to dine alone, but could I do

❖ it after that! Hardly. So I took up my egg, my slice of bread, and my napkin, and moved over to the other table. You can do that at Child's, when you couldn't at Delmonico's without first asking the waiter's permission. But at Child's we are very Democratic, or Cosmopolitan, whichever it is. So as I say, I just moved over, and I broke right in on that conversation.



"I AM NO SHERLOCK HOLMES," said I, "but I rather opine (opine is

❖ good, what?), I say I rather opine, that you gentlemen are interested in mechanical dentistry. Is there any little problem therein that I might elucidate for you?" "And who might you be," asked Man No. One. "Well," said I, "I might be the Queen of the Movies, but I am not. I am merely the Editor of 'Items of Interest.'"



DO YOU KNOW I could see right away that they suspected that I had over-

❖ heard part of their talk, and Man No. Two hastened to interject: "We meant no offense by what we said." "Offense!" said I, "Why boys you could not offend me with a dynamite bomb. But really I used to polish rubber plates once myself, and maybe I could give you a point or two."

■ ■ ■
“IF YOU REALLY THINK SO,” said Man No. One, “go right on where
♦ you started. Tell us something about polishing plates; and what is the
♦ quickest way to get the plate thin. Do you use scrapers or files or
♦ sandpaper.”
■ ■ ■

“WHY THAT IS EASY,” said I. “You may not know it, but it is a fact
♦ that I served a sort of apprenticeship with Dr. Norman W. Kingsley,
♦ one of the greatest mechanical dentists of his day. Nowadays the same
♦ sort of a man is a prosthodontist, but he does not know any more in
♦ proportion to what he ought to know than Kingsley did. And I learned
♦ quite a few mechanical tricks from the Old Man. For example this very
♦ question of making a plate thin, and of polishing it. The best way to
♦ make a plate thin, is to make it thin. Don’t make it thick and then
♦ scrape, file or sandpaper it for an hour. If you adopt that method
♦ some day you will scrape a hole through a plate, and then you can start
♦ right in and make it over again.”
■ ■ ■

“BUT HOW DO YOU make it thin,” persisted Man No. One.
■ ■ ■

“USE THE THINNEST of wax, in waxing up. Don’t be afraid to use it too
♦ thin, because your plate will be a little thicker than your wax in any
♦ event. So have your wax thin enough and your plate when vulcanized,
♦ will need no scraping. The same is true in regard to polishing. Always
♦ polish your plate before you vulcanize it.”
■ ■ ■

“BUT HOW THE deuce can you do that,” asked Man No. Two.
■ ■ ■

“SIMPLEST THING in the world,” said I. “After waxing up to your satis-
faction, use a blow pipe and pass the flame rapidly over the wax. This
♦ slightly melts the surface and when it congeals again, it will have a fairly
♦ good polish. When thoroughly cold, rub the surface of the wax with
♦ the ball of the thumb, and it will take a fine gloss. Then burnish tin
♦ foil over the wax and after vulcanization, and removing the actual ex-
♦ cess of rubber, which should have been forced into gates cut in the
♦ plaster, you should be able to take your plate direct to the polishing
♦ lathe without use of file or scraper.”
■ ■ ■

“BUT IF THROUGH accident or lack of care a plate is a bit too thick, I
♦ will describe a method that was invented by Dr. J. Albert Kimball and
♦ placed on the market by him for a short time. He took some wooden
♦ mandrels, made to fit the lathe, and by revolving one in the lathe he
♦ would wrap around it, into a cone, a strip of sandpaper about an inch
♦ wide. These sandpaper cones were temporarily tied with a cord, and
♦ then removed from the mandrel and the edges smeared with glue.
♦ When the glue hardened he had cones of sandpaper which could be used
♦ on the lathe, and as the sand would wear off, a strip could be removed,
♦ exposing a fresh cutting surface. These sandpaper cones, made in dif-
♦ ferent grits were very useful in the laboratory. Some manufacturer
♦ ought to market them.”



Items of Interest

"YOU SPOKE of making the trial plate thin," said Man No. One. "Don't see how you can do that and use it to take your bite?"



"I DID NOT tell you," said I, "to make your trial plate thin, nor did I tell you to use a thin wax plate for taking a bite. I told you to wax up your plate with thin wax, just before flasking. There are two ways out of your dilemma. Personally I always waxed up a thin plate, and vulcanized it without any teeth on it, before ever taking the bite. In fact I used this vulcanite plate for taking the bite. One great advantage of this method is that you discover before setting up your teeth, whether your impression and model were correct, and whether your plate will stay up. Remember that almost anyone can make a plate with a vacuum chamber in it that will adhere so tightly that the patient cannot pull it down. But unfortunately a patient does not pull on his teeth when chewing. Quite to the contrary, he pushes on the plate. And to test a plate you should do the same. Make a trial plate by vulcanizing it without teeth, try this in the mouth, and then with the index finger press upon every part of the plate, and if it can be dislodged, it is worthless. If it withstands such tests it will carry the teeth without disturbing the adhesion, provided, of course, the teeth are properly occluded. An improper occlusion will trip any plate."



"IF YOU PREFER to use a wax trial plate for taking the bite, or one made of base-plate gutta-percha, then after the teeth are set up, and the labio-buccal rim added and carved to form, this rim should be waxed fast to the model, so that the teeth cannot be disturbed by the next step. Then with a sharp knife, slightly warmed in the Bunsen flame, the entire palatal portion of the wax must be cut away. After this, a new palatal portion is added using wax of the thickness, or a little thinner than you desire that the plate should be.



"WHERE THE FIRST and really the best method is used, after making the plate without teeth, the teeth may be attached to this plate with wax, which may then be replaced with rubber in a second vulcanization. As the plate is to be vulcanized a second time it is as well not to over vulcanize it the first time. By this method a pretty result may be had by making the plate of black or dark red rubber, and attaching the teeth with pink, leaving a slight margin of the dark rubber above the pink along the rim, for protection of the pink, which is never so strong as the red or black. Of course, as you know, the pink rubber may be bleached and the color improved by placing it in a tumbler of alcohol covered with a piece of glass and setting the same in the sun for a few hours."



"CAN YOU TELL me a good way to repair a broken rubber plate," asked Man No. Two. "I have a great many full uppers come back to me broken in half, and after vulcanization they break again. Then after two or three repairs the plate not only looks like a patch work quilt, but the rubber is as brittle as sealing wax."



"YES, I CAN GIVE you a point in repairing plates," said I, "which I am surprised is not more commonly utilized. I think that usually the two halves of the plate are waxed together, a model run, and then some of the vulcanite is cut away on each side of the crack, and the rest of it roughened for a short distance, after which the parts are waxed up on the model, flasked, packed and vulcanized. By this method you will note that the wax must be cleansed away from the part of the old rubber which is to be lapped by the new, and unless this is thoroughly well done the dirty surface of the old rubber does not unite well with the new. In any event it is a poor way of making a repair because the old rubber, made thin, and then lapped by the new is never very strong. Whereas there is a method by which a plate after repair may be just as strong as a new plate."

■ ■ ■

"TELL US ABOUT IT," said both men.

■ ■ ■

"WHEN A FULL UPPER plate comes in broken in half, or nearly broken in two, the first step, of course, is to pour a model. Next the plate should be removed from the model and with a fine jeweler's saw the entire palatal portion should be cut away, the saw passing as near the teeth as possible. That portion which has been sawed out should then be replaced on the model, together with the parts carrying the teeth, in their proper relative positions, and again fastened together with wax. The plate should then be flasked, and when the flask is opened the palatal pieces are readily taken out and the little wax that was used easily removed with boiling water. But it is at this stage, and at a time when no more wax is needed, that a sharp clean bur is used in the engine for thoroughly cutting and dovetailing into the old rubber, which is still attached to the teeth, and right into this freshly cut surface new rubber is at once packed. Rubber dissolved in chloroform may be smeared over the surface of the old rubber, but this is not necessary. If the surface is really clean when the new rubber is packed, there will be perfect union after vulcanization. In this way an entirely new palatal portion is obtained, and solidly anchored into a thick portion of the old rubber, instead of lapping a thin joint as is commonly done."

■ ■ ■

"BUT IF THE PATIENT could break the original plate," asked Man No. Two, "why can't he break the repaired plate, even if, as you say, it is as strong as it was before?"

■ ■ ■

"THE FIRST BREAK might have been an accident that may not recur," said I. "But there are patients, who, as you say, continually break vulcanite plates through the center. If such a person cannot be persuaded to have a gold plate, then there is still another method of overcoming the difficulty. Make a new plate as follows. After setting up the teeth with plaster, take an impression of the six front teeth, the plaster flowing over their labial surfaces, and slightly over the incisive ends. When this impression is hard, remove the teeth from the wax, and place them in the impression, of course, cleansed of all wax. Next



Items of Interest

- ❖ bend a piece of iridio-platinum wire of about 16 gauge, so that it will touch
- ❖ the pins of all six teeth. Attach the bar to the teeth with sticky wax,
- ❖ remove teeth and bar together and invest in your favorite soldering
- ❖ investment. When hard heat up slowly, but thoroughly, and solder the
- ❖ bar to each pin. When cold you will have your six front teeth soldered
- ❖ to an iridio-platinum bar, and in proper relation to one another. The
- ❖ teeth may be replaced on the model in proper position and when vul-
- ❖ canized into the plate the bar renders it almost unbreakable through the
- ❖ centre. A bar vulcanized in the same position, but not soldered to the
- ❖ teeth does not accomplish the same purpose. On the contrary it weakens
- ❖ rather than strengthens the plate."



"AND NOW BOYS I must be going," said I. "Hereafter don't ever think

- ❖ that I think that I know it all, because I don't. And don't think I have
- ❖ told you all I know, because I haven't. I hope I shall meet you again.
- ❖ Good night."



AS I WAS paying my check at the cashier's desk, one of the ways they have

- ❖ of doing things at Child's, I heard Man No. One remark (*soto voce* I
- ❖ think it was): "I don't see that he told us so much after all!"





James Truman, D.D.S., LL.D.

Died at his home in Philadelphia, November 26th, Dr. James Truman.

Dr. James Truman was born at Abington; near Philadelphia, November 22, 1826. When an infant his parents, George and Catherine L. Truman, returned to Philadelphia. The original founder of the family came from England with William Penn, and the Truman family lived in Philadelphia for many generations.

He studied dentistry with his father and graduated from the Philadelphia College of Dental Surgery in 1854. From 1855 to 1858 he practiced at Waterloo, a town in western New York, returning to Philadelphia in the latter year. In 1864 he was appointed Administrator in Chief of Operative Dentistry in the Pennsylvania College of Dentistry. Prior to this time the mechanical side of dentistry had received the greatest amount of attention, and Dr. Truman was one of the pioneers in the effort to elevate the general practice or what might be termed the medical aspect of dentistry to a higher plane. He made a special study of the teeth of inferior forms and finally presented an important paper on the subject of supplemental and supernumerary teeth.

He next turned his attention to the subject of bleaching of teeth, and finally gave the profession a process which has practically remained unchanged since 1868, when he first described his technique, with the exception that with the advent of newer agents a somewhat higher proportion of success is now possible.

He next announced a system of preparing cavities for the reception of fillings of cohesive gold with special attention to proper mechanical principles of retention and the correct formation for anchorage. This thesis appeared in the *Dental Times*.

He was elected to the chair of Dental Physiology and Operative Dentistry in the Pennsylvania College of Dental Surgery, and occupied the position from 1865 to 1876. During this period the question of the admission of women to a place in dentistry began to be agitated. Dr. Truman openly advocated the admission of women as students in the dental schools, and gave his views in a valedictory to the graduating class before a large audience in Musical Fund Hall, Philadelphia, in

1866. This caused a sensation and much adverse criticism from other members of the faculty and from some of the dental profession. In 1869, at Saratoga, Dr. Truman introduced a resolution before the American Dental Association, asking that body to recommend "subordinate associations to admit to full membership any woman duly qualified." The resolution was promptly laid on the table, an action which did not surprise Dr. Truman, but the introduction of the resolution attracted considerable attention and undoubtedly was the initial impulse which finally resulted in the admission of women to the practice of dentistry.

During his connection with the Pennsylvania College of Dental Surgery, Dr. Truman became the editor of the *Dental Times*, retaining the position for four years.

His investigations in regard to the use of mallet force in conjunction with cohesive gold established the fact that the lead mallet was not equal to the steel mallet, and that the electro-magnetic mallet of Bonwell was superior to all others. He made extended experiments in regard to the use of tin as a filling material, trying various forms, such as roll tin, tin chipped from the block, etc., in an effort to determine the greatest amount of cohesion to be secured. He proved that the old methods were defective and claimed that the best results could be had by relying upon the natural cohesive properties of metal.

In 1876, in consequence of failing health, he moved to Frankfort, Germany, resigning from the Pennsylvania College of Dental Surgery. In 1877 he left Frankfort and established himself in Hanover. He attracted a rapidly increasing practice among the nobility and better class of people of that section. In 1880, however, because of the death of his wife, he left Germany and resumed practice in Philadelphia.

In 1877 the Pennsylvania College of Dental Surgery conferred upon him the honorary degree of D.D.S. In 1882 the Department of Dentistry of the University of Pennsylvania elected him Professor of Dental Pathology, Therapeutics and Materia Medica. In 1883 he was made Secretary of the Dental Department and subsequently Dean, which position he held until 1896, when he retired. In 1890 he assumed the editorship of the *International Dental Journal*, a magazine published by dentists in the interests of dentists. He was editor at the time when the publication of the journal ceased in 1895.

He was always a prominent figure when attending dental meetings and an aggressive leader in many important discussions. He contributed many original articles to the periodical literature and was one of the authors whose writings appeared in the "American Text Book of Operative Dentistry." He was active and honorary member of many dental associations and societies, and was one of the four who originated the

organization of the National Association of Dental Faculties. He occupied various offices in that body and was President for one year. He was the last President of the American Dental Association before the amalgamation of that body with the Southern Dental Association to form the present National Dental Association.

The University of Pennsylvania conferred upon him the honorary degree of LL.D.

William Ernest Walker, D.D.S., M.D.

Died at his home in New Orleans, November 21, 1914, Dr. Wm. Ernest Walker.

William Ernest Walker, D.D.S., M.D., was born March 3, 1868, in New Orleans, La. He was the son of J. R. Walker, D.D.S., who practiced dentistry in New Orleans up to the time of his death in 1887, and Jeanie Mort, known to the profession as "Mrs. M. W. J.," over which *nom de plume* she contributed many articles to the various dental journals, particularly a department which she originated and called "Practical Points," in ITEMS OF INTEREST. She died in 1907.

William Ernest Walker attended the public schools of New Orleans and studied dentistry in his father's office, later graduating with high honor from Baltimore College of Dental Surgery in 1889. He opened his first office at Bay St., Louis, Miss., later moving to Pass Christian, Miss., where he enjoyed a large practice. While practicing at Pass Christian he filled the chair of Clinical Dentistry at the Dental Department of the Southern Medical College in Atlanta, Ga., at the same time taking a medical course.

After two years spent in Atlanta he became connected with the Baltimore College of Physicians and Surgeons, occupying the chair of Operative Dentistry while completing his medical studies. After obtaining his M.D. degree he resigned his professorship in order to devote all his time to practice.

Becoming more and more interested in orthodontia he finally moved to New Orleans about twelve years ago giving up the general practice of dentistry and limiting his practice to orthodontia and facial orthopedia, in which specialty he was remarkably successful.

During his first few years of orthodontic practice in New Orleans he was Dean of the New Orleans College of Dentistry where he also taught orthodontia. His death was quite unexpected, the result of uremia, following an illness of one week.

He is survived by two sisters, Mrs. S. A. Allis of Leesville, La..

and Mrs. D. P. Allen of Beaumont, Tex., and one brother, J. Mort Walker, an officer of the Commercial Germania Trust and Savings Bank of New Orleans.

At the time of his death he was Secretary and Treasurer of the American Society of Orthodontists, member of Delta Sigma Delta Fraternity and numerous local, State and National Dental and Medical Associations. He was first to point out the anatomical fact of the downward and forward movement of the condyles and invented the first anatomical articulator which reproduced the motion of the mandible, as also a number of appliances which he used in the practice of his chosen specialty.

Thomas Edward Turner, D.D.S.

Thomas Edward Turner, D.D.S., was born at Carrollton, Mo., June 22, 1868. He was educated in the public school and high school of that city and was a clerk in the Missouri Legislature at Jefferson City for several years.

He began the study of dentistry in the office of Dr. J. S. Hassell, of Carrollton, entered the Missouri Dental College, now Washington University Dental School, in September, 1888, graduating in the class of 1890. Immediately after graduating he located in Neosha, Mo., for several years, and on September 21, 1892 he was married in that city to Miss Mary Lee Moss, who survives him. He came to St. Louis about 1896 and entered into partnership with Dr. Holmes; this partnership continued until 1900, when it was dissolved, Dr. Turner continuing in practice alone until November 14, 1914, when he was accidentally killed while cranking his automobile.

Soon after graduation he became a member of the Missouri State Dental Association and was elected Vice-President in 1914. After moving to this city he connected himself with the St. Louis Dental Society and was its President in 1903. In 1904, Dr. Turner was appointed a member of the Missouri State Board of Dental Examiners, which position he retained to the time of his death. He enjoyed the distinction of being the only Democrat reappointed on the Board by a Republican Governor. His work on the Board was such that through his efforts St. Louis, the fourth largest city in the United States, enjoys the distinction of being freer from dental quackery than any other city of near its size in the country. He was especially active in all the meetings of the National Association of Dental Examiners and the National Dental Association during the last ten years. He was President of the National

Association of Dental Examiners in 1912, and Third Vice-President of the National Dental Association at the time of his death. He was a member of the Masonic Fraternity, being a Past Master of Rose Hill Lodge No. 550.

The work of Dr. Turner since he located in this city has been of such a character as to attract the attention of his profession, not only in his own State, but throughout the country. In the death of Dr. Turner the profession has sustained a loss that will be hard to fill, just how hard, only those who knew him best and loved him most can tell. His professional ability and his modest Christian character endeared him to a host of friends, who mourn most sincerely with his bereaved widow and family. May we all

"So live that when thy summons comes to join
The innumerable caravan, which moves
To that mysterious realm, where each shall take
His chamber in the silent halls of death;
Thou go not like the quarry slave at night
Scourged to his dungeon, but sustained and soothed
By an unfaltering trust, approach thy grave
Like one who wraps the draperies of his couch
About him and lies down to pleasant dreams."

J. H. KENNERLY.

Dr. J. Morgan Howe.

Died at his home in New York City, on Friday, November 13, 1914,
Dr. J. Morgan Howe.

The family of Dr. Morgan Howe lived in Sudbury, Mass., for six generations. His grandfather was Dr. Bezeleel Howe who served as a Captain in the Guard of General George Washington throughout the War of the Revolution. His father was Dr. John Moffitt Howe, a dentist who practiced in New York City.

Dr. J. Morgan Howe was born October 19, 1844 in New York City. In 1853 his father moved to Passaic, N. J., practicing in that city until 1867. In addition to the practice of his profession, he interested himself in educational matters, and in 1865 was made a trustee of the State Normal Schools, in New Jersey, an office which he held for twenty years.

Dr. J. Morgan Howe studied his profession with his father. In 1867 he opened an office in 17th Street, New York City. He received the degree of M.D.S. from the New York State Board and the degree of M.D. from the New York Homeopathic Medical College in 1879. In

1879 he moved his office to 34 W. 35th Street, and six years later to West 47th Street, where he resided up to the time of his death.

He became a member of the Odontological Society in 1879 and for several years was Corresponding Secretary. Later was elected Vice-President and then President. He was one of the Charter Members of the New York Institute of Stomatology and three times elected President. He was a member of the Quill Club from 1895 to 1913.

In 1866 he married Miss Emma Rowe of Passaic, N. J., who died in 1904. In 1911 he married Miss Payne, who survives him. He leaves three daughters and one son by his first wife.

During the latter years of his life he had charge of St. Bartholomew's Clinic, which he had organized. He was a firm believer in the strictest adherence to the code of ethics, and therefore an ardent advocate of what is known as independent journalism. For similar reasons he was violently opposed to patents and to the use of nostrums or secret formulæ. He did considerable scientific investigation and was one of the prime movers in the research movement started by the Institute of Stomatology and now continued by the First District Dental Society, into which the Institute has been merged.





National Society Meetings.

AMERICAN INSTITUTE OF DENTAL TEACHERS, Ann Arbor, Mich., January 26-28, 1915.
Secretary, Dr. J. F. Biddle, 517 Arch St., N. S., Pittsburgh, Pa.

NATIONAL ASSOCIATION OF DENTAL FACULTIES, Ann Arbor, Mich., Jan. 25-26, 1915.
Secretary, Dr. C. C. Allen, 10th & Troost, Kansas City, Mo.

PANAMA-PACIFIC DENTAL CONGRESS, San Francisco, Cal., September, 1915.
Secretary, Dr. Arthur M. Flood, 240 Stockton St., San Francisco, Cal.

State Society Meetings.

ALABAMA DENTAL ASSOCIATION, Montgomery, Ala., April 13, 1915.
Secretary, Dr. J. A. Blue, Birmingham, Ala.

ARIZONA STATE DENTAL SOCIETY, date and place will be announced later.
Secretary, Dr. J. L. O'Connell, Phoenix, Arizona.

ARKANSAS STATE DENTAL ASSOCIATION, date and place will be announced later.
Secretary, Dr. W. B. Dormon, Nashville, Ark.

CONNECTICUT STATE DENTAL ASSOCIATION, Hartford, Conn., April 20-22, 1915.
Secretary, Dr. E. R. Bryant, New Haven, Conn.

FLORIDA STATE DENTAL SOCIETY, date and place will be announced later.
Secretary, Dr. Alice P. Butler, Gainesville, Fla.



Items of Interest

ILLINOIS STATE DENTAL SOCIETY, Peoria, Ill., May 11-14, 1915.

Secretary, Dr. Henry L. Whipple, Quincy, Ill.

INDIANA STATE DENTAL ASSOCIATION, Indianapolis, Ind., May 18-20, 1915.

Secretary, Dr. A. R. Ross, Lafayette, Ind.

IOWA STATE DENTAL SOCIETY, Waterloo, Ia., May 4-6, 1915.

Secretary, Dr. C. M. Kennedy, Des Moines, Iowa.

MARYLAND STATE DENTAL ASSOCIATION, Baltimore, Md., June 11-12, 1915.

Secretary, Dr. F. F. Drew, 701 N. Howard St., Baltimore, Md.

MASSACHUSETTS DENTAL SOCIETY, Boston, Mass., May 5-7, 1915.

Secretary, Dr. A. H. St. C. Chase, Everett, Mass.

MINNESOTA STATE DENTAL ASSOCIATION, date and place will be announced later.

Secretary, Dr. Max E. Ernst, 614 Lowry Bldg., St. Paul, Minn.

MISSOURI STATE DENTAL ASSOCIATION, Golden Jubilee Meeting, Jefferson City, June 10-12, 1915.

Secretary, Dr. S. C. A. Pubey, New York Life Bldg., Kansas City, Mo.

MISSISSIPPI DENTAL ASSOCIATION, Jackson, Miss., April 20-22, 1915.

Secretary, Dr. M. B. Varnado, Osyka, Miss.

MONTANA STATE DENTAL SOCIETY, date and place will be announced later.

Secretary, Dr. F. W. Adams, Chicago Block, Billings, Montana.

NEW HAMPSHIRE STATE DENTAL SOCIETY, date and place will be announced later.

Secretary, Dr. Louis I. Moulton, 15 No. Main St., Concord, N. H.

NEW JERSEY STATE DENTAL SOCIETY, date and place will be announced later.

Secretary, Dr. John C. Forsyth, 430 E. State St., Trenton, N. J.

NEW MEXICO STATE DENTAL SOCIETY, Albuquerque, N. M., date will be announced later.

Secretary, Dr. J. J. Clarke, Artesia, N. M.

NEW YORK STATE DENTAL SOCIETY, Albany, N. Y., May 13-15, 1915.

Secretary, Dr. A. P. Burkhardt, 52 Genesee St., Auburn N. Y.

NORTH CAROLINA DENTAL SOCIETY, Wrightsville Beach, N. C., June 23-25, 1915.

Secretary, Dr. R. M. Squires, Wake Forest, N. C.

OKLAHOMA STATE DENTAL SOCIETY, Oklahoma City, Oklahoma, March 15-19, 1915.

Secretary, Dr. C. R. Lawrence, Enid, Oklahoma.

PENNSYLVANIA STATE DENTAL SOCIETY, Reading, Pa., June 22-24, 1915.

Secretary, Dr. L. M. Weaver, Philadelphia, Pa.

RHODE ISLAND DENTAL SOCIETY, Providence, R. I., Jan. 14, 1915.

Secretary, Dr. Jas. E. Heap, 425 Grosvenor Bldg., Providence, R. I.

SOUTH CAROLINA STATE DENTAL ASSOCIATION, Columbia, S. C., April 13-16, 1915.

Secretary, Dr. Ernest C. Dye, Greenville, S. C.

TENNESSEE STATE DENTAL ASSOCIATION, Sewanee, Tenn., June 24-26, 1915.

Secretary, Dr. C. Osborn Rhea, 625½ Church St., Nashville, Tenn.

TEXAS STATE DENTAL ASSOCIATION, Galveston, Texas, May 19-22, 1915.

Secretary, Dr. W. C. Talbot, Fort Worth, Texas.

UTAH STATE DENTAL SOCIETY will meet in San Francisco, Cal., during the Panama-Pacific Dental Congress in August, 1915.

Secretary, Dr. E. C. Fairweather, Boston Bldg., Salt Lake City, Utah.

VERMONT STATE DENTAL SOCIETY, May 19-21, 1915.

Secretary, Dr. P. M. Williams, Rutland, Vt.

W. VIRGINIA STATE DENTAL SOCIETY, Wheeling, W. Va., April 14-16, 1915.

Secretary, Dr. J. W. Parsons, Huntington, W. Va.

WISCONSIN STATE DENTAL SOCIETY, Oconomowoc, Wis., July 13-15, 1915.

Secretary, Dr. O. G. Krause, 1209 Wells Bldg., Milwaukee, Wis.

Chicago Dental Society.

The annual mid-winter meeting of the Chicago Dental Society will be held in the Hotel La Salle, January 29 and 30, 1915.

Friday, January 29th, Dr. Robert B. Preble will read a paper entitled "Diagnosis of Systemic Disturbances Due to Oral Infection." Dr. Preble is a physician and one of the leading diagnosticians in America. The paper will be of practical interest to members of both the medical and dental profession. On the same date, Dr. Elmer S. Best will present a paper entitled "The Surgical Treatment of Pulp Canals as a Prevention of Systemic Disturbances." Dr. Best has made a special study of this phase of the subject and will give us something revolutionary in character.

Saturday, January 30th, will be devoted to clinics. The clinicians will be so arranged that one can see to the best advantage the clinic in which he is especially interested. The meeting will close with a banquet Saturday evening, at which there will be speakers of national reputation and other attractions of equal interest to the audience.

The exhibitors' display room will be open during the entire meeting.

T. L. GRISAMORE, President.

P. B. D. IDLER, Secretary.

Minneapolis District Dental Society.

The Minneapolis District Dental Society will hold its annual meeting on February 11-12-13, 1915, in the City Hall, Minneapolis. The first two days will be devoted to progressive clinics, papers and exhibits, and the third day to an office-to-office clinic.

Everything points to a most successful meeting, so reserve the time now.

DR. HARRY W. NELSON, Secretary.

Harvard Dental Alumni Association.

A special meeting of the Harvard Dental Alumni Association will be held at the Harvard Union, corner of Harvard and Quincy Streets, Cambridge, Mass., on Thursday, January 14th, at six o'clock. Dinner will be served at seven o'clock; tickets \$1.50 each.

Everyone of the graduates of the school is cordially invited to attend, whether or not he is a member of the association. After dinner we will hear something about Harvard athletics, and we have the promise of the use of the reel of moving pictures of the last Yale game.

HAROLD DEW. CROSS, *Pres.*

FRANK T. TAYLOR, *Sec.*

Chattanooga Dental Society.

The annual business meeting of the Chattanooga (Tennessee) Dental Society was held recently, during which the following officers were elected:

President—Dr. William F. Stone; Vice-president—Dr. N. C. Hunt; Secretary—Dr. I. R. Stone; Treasurer—Dr. George W. Wagner.

A paper read by Dr. R. S. Henry on vaccine therapy in oral infections provoked much interesting discussion.

The society is planning to give semi-annual banquets to which dentists of national reputation will be invited to deliver scientific addresses. This organization, like all others in the "Dynamo of Dixie," is characterized by the qualities of life and progressiveness, the latter being demonstrated by the members' desire to keep in touch with the latest thought and discoveries in connection with their profession, by hearing the principal exponents thereof in their own midst. Incidentally, they anticipate little trouble in getting the men they desire to hear, to visit Chattanooga, which is a very attractive place to visit on account of its historic and scenic wonders, such as Lookout Mountain, Chickamauga Park, Missionary Ridge, Signal Mountain, beautifully winding and picturesque Tennessee River—everyone of them in some way identified with stirring events of the Civil War.



Exclusive Contributions

- | | |
|------------------------------|-----|
| Amœbae in Pyorrhæal Pockets. | 81 |
| C. EDMUND KELLS, D.D.S. | ... |

Orthodontia

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Amœbae in Pyorrheal Pockets.

By C. EDMUND KELLS, D.D.S., New Orleans.

The fact that Drs. Barrett and Smith of the University of Pennsylvania, that Drs. Bass and Johns of Tulane University of Louisiana, and Dr. Angelo Chivaro of Rome, Italy, independently discovered the presence of amœbae in the pockets accompanying pyorrhea, and at the same time announced that ipecac is a specific for amœbae, is sufficient in itself to make ordinary dentists "sit up and take notice."

Drs. Barrett and Smith inject emetin into the pyorrhea pockets and their walls, while Dr. Bass injects it hypodermatically into the arm.

The latter method appears to me the better of the two, and so I have adopted it. The one almost painless hypodermatic puts the full dose into the blood stream, while with Dr. Barrett's method of injecting the pockets, one would usually have many injections to make.

It being the writer's good fortune to be personally acquainted with Drs. Bass and Johns, it was but natural for him to obtain from them careful instructions in this pratique.

Believing that at this time all dentists who have the welfare of their patients at heart, should investigate this subject freely, the writer is giving a detailed account of the method of treatment now pursued in his office, as suggested by Drs. Bass and Johns.

Items of Interest

1. If, upon examination of the mouth, pyorrhea is either suspected or recognized, a microscopic examination is determined upon.

2. From around which teeth the scrapings are taken is noted, and a glass slide is prepared accordingly, as shown in Fig. 1.

Here the No. 1 represents the patient's number. The symbols record from which teeth the scrapings were taken, the etchings are done with a



Fig. 1.

1914 Dec.	Name	RECORD				Condition
		Amœbae	Hypo	Tablets		
31	Mr. Brown	Plenty	Yes	No	Bad	
"	Mr. Smith	Few	No	Yes	Favorable	

Fig. 2.

small carborundum stone in the engine, so that they are indelible—being a much better method than writing upon the slide with a glass pencil, which marks are easily effaced.

3. Scrapings are then taken from the pockets, recorded, and smeared very thinly opposite their respective symbols. These scrapings should be taken from the *bottoms* of the pockets, and should be as free from blood as possible, "which is easier said than done." Sometimes a toothpick properly trimmed, at other times Younger scalers are used for this purpose.

4. The patient's name and the number of the slide are then recorded on a sheet prepared for the purpose, and kept in our loose leaf day book.

5. An immediate examination of the slide may be made for the *live amœbae*, but time may usually be much better employed than in such a search while the patient is in the chair, so it is immediately properly heated to fix the specimens.

6. At our convenience the slide is stained and a microscopic examination is made, the result being recorded in the book.



7. If the examination proves negative, assuming that it might be through error in technique, at the next sitting a duplicate is made. Every effort must be made to positively recognize the amoebae.

8. If the case is a bad one, one-half grain emetin hydrochloride in 1 c.c. of distilled water is injected in the left arm near the shoulder, for each of three successive days—*they must be successive*.

Unless the solution is freshly made and therefore warm, the syringe should be heated by being well rinsed out with boiling distilled water, which will in turn warm the emetin to the proper temperature for injecting.

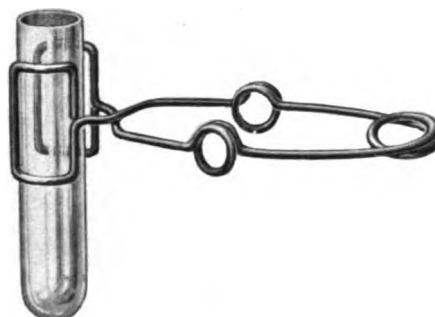


Fig. 3.

9. Only fresh solutions should be used, which are readily made by dissolving one tablet in 1 c.c. of distilled water at the time of use, or if well taken care of, sufficient for three doses can be prepared at once. In some cases some soreness of the arm follows the injection.

10. If the disease is limited apparently to one or two teeth only, instead of giving the hypodermic of emetin, one bottle of forty tablets of ipecac that does not dissolve in the stomach is prescribed, three to be taken twice daily after meals.

11. The patient is instructed to put two drops of fluid extract of ipecac in a small quantity of water and to rinse the mouth most thoroughly the last thing at night, after the teeth have been properly brushed and cared for.

12. At the end of about a month, a second microscopic examination is made. If amoebae are found, then a second series of emetin is injected for those treated under caption 8, and for those under 10, emetin must be used hypodermatically.

At this stage I must "leave off" for I have gotten no further, not having used the treatment for two full months at this writing.

Whether or not emetin is a specific for Rigg's disease cannot be determined by the writer in such short time, but it is a well-confirmed fact that under this treatment the conditions in the mouth are vastly improved—whether permanently so, time only can determine.

One cannot learn to discover amœbae by the absent method, but personal lessons must be taken from a bacteriologist. Where this is impossible, due to the location of the dentist, he should arrange to take the specimens and forward them to some laboratory for diagnosis.



Fig. 3.

Amœbae are old friends of bacteriologists. Emetin as a specific for them is not a new remedy, consequently up to this stage there is no experimentation, when this remedy is given. The only newly recognized feature is that if there are amœbae *within the tissues* of the mouth, they will be destroyed.

In Fig. 2 is shown the manner in which these cases are recorded and kept track of at present. Possibly a better method may be learned later.

An all glass syringe is necessary for this use, and every precaution must be used to insure thorough antisepsis. An iridio-platinum needle is advisable but not necessary. A small tube is first filled with distilled water which is boiled for a few minutes and then thrown out. A little more (to allow for evaporation) then three c.c. of fresh distilled water are then placed in the test tube and boiled—then three half-grain tablets of emetin hydrochloride are dissolved therein.

The syringe and needle if not previously boiled in distilled water and kept in a sterile condition, are now boiled, and 1 c.c. of the prepared solution drawn in. The arm is bared and the spot selected for the injection is touched with lysol—that is all that is necessary to render the spot aseptic—and the injection made in the usual manner. The syringe

and needle are now thoroughly rinsed with distilled water, well boiled in distilled water and placed in a sterilizer for safe keeping.

Teeth that are in the condition as was this molar (Fig. 4) are hopeless, of course, and should be extracted.

The skiagraph shows the alveolus to have been practically all destroyed. The tooth could have been removed with the fingers.

This treatment will not bring the dead to life. The hope is that used in time it will *prevent the ravages of the disease*.

P. S.—Since receiving the above, a communication from Dr. Kells arrived too late for alteration of the illustration of his microscopic slide (Fig. 1). He states that at present he marks the slide with plus or minus signs (+ or -), to indicate at a glance the presence or absence of amœbae in the specimens, thus saving much time if future examinations of the slide must be made.—EDITOR.





The Causes of Abnormalities—Heredity or Environment.

By CHARLES E. WOODRUFF, M.D., Lt.-Col., U. S. Army (Retired), Co-Editor
American Medicine, New York.

Read before the American Society of Orthodontists, Toronto, 1914.

The investigations of recent years have brought to light many facts which may solve the old puzzle as to the relative influence of heredity and environment in the production of abnormalities. All medical men, especially orthodontists, are vitally interested in such academic studies, and it is to them we must look for facts which will lead the way to prevention. In searching for causes we will be led astray unless we keep clearly in mind some of the basic principles of heredity and development. In the first place, let it be fully realized that the great law of origin of species by the selection of favorable variations—what is commonly known as Darwinism—has been so thoroughly proved to be true that it is now the basis of all the biologic sciences. We are not yet sure about the causes of variations and it has been proved that some of Darwin's guesses are not correct, but the great law itself remains exactly as he stated it. Recently it has become almost a fad with a few writers—particularly clergymen—to state that Darwinism has been abandoned by biologists, but the truth is the opposite.

Briefly, the known facts are as follows. No

Known Facts To Regard to Specific Characters.	two offspring of a pair of beings are exactly alike. Far more are born than can possibly survive, and there are many lethal agents which kill off the surplus, the survivors of this slaughter being those whose variations enabled them to escape. These survivors transmit their new traits to their offspring, which as a whole are therefore slightly
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different from their grandparents. By the accumulation of these minor differences generation to generation, new species arise.

The puzzle has always been to account for the variations in Species. variations and to explain why they are transmissible.

Lamarck conceived the idea that the use or disuse of organs or parts causes hypertrophy or atrophy and these modifications are transmitted. This theory was long rejected because there was no evidence that any modification of the body or somatic cells ever influenced the germ cells in the ovary or testicle so that they reproduced a mutilation or any other modification. We have certain proof that men have lost teeth for many tens of thousands of years, probably hundreds of thousands, and yet babies are always born with the germs from which sprout all the fifty-two teeth.

Lamarckianism is beginning to be favorably considered, but it is in a sense wholly different from that theory conceived by Lamarck himself. It has been shown by many experimenters that if germ cells are acted upon sufficiently strongly mechanically or by light, heat or chemical substances, the ovum will develop into something different from the parent, and that the change in the germinal protoplasm may be permanent. That is, the ovum in its development sets aside certain cells which form the tissue of the ovary or testicle, and these cells are exact counterparts of the ovum. The germ cell has no power to revert to the type in the grandparent or in the parent before the poisoning. It has been permanently changed, but in the absence of such a poisoning, the germ cell is the same, generation after generation. This is what Weismann calls the "continuity of the germ plasm." The body is considered a mere temporary home for the germ plasm and dies as useless as soon as a piece of the protoplasm is cut off and builds up a new home for itself.

Weismannism does not deny that the germ cells are ever modified in the ovary or testicle so that they develop differently from the parents. Indeed it assumes that this always happens as it is practically impossible that the blood serum which bathes these cells should be constant in composition or in its dissolved chemicals. This constant variation in the cell's environment must so prevent uniformity that no two germ cells are exactly alike. The new viewpoint is this: the modified germ cells develop into something more or less different from the two parental types—not necessarily resembling either or the mean between them. Weismannism assumes that variations of nutrition or poisoning by abnormal substances in the blood serum of the parent permanently modify the germ plasm, so that it develops a body different from the parent, and that the parts

of the germ plasm which form the germ cells in the ovary of this offspring will necessarily repeat the process for the next generation. The more perfect the manner of living, the less will be these changes in the germ plasm and the more closely will the offspring resemble each other and the parental type. That is, no variation of the body is of itself transmissible. What is handed down, is the changed condition of the germ plasm, and this new protoplasm will continue to develop these new body forms as long as it is not modified by later factors.

Mutilations of the body can have no possible effect on the germ cells and are therefore never transmitted. Nor are any other modifications or acquirements of the body ever transmitted. A man may become very distorted from occupational stresses but his children are born as he was born. A man may become very learned in a certain line but the knowledge is never transmitted. Similarly, training of the body or brain, may develop that body or brain to better efficiency, but it has no effect whatever on the next generation, except that such a parent may be able to teach his children better than an ignoramus could.

By looking to the environment for the cause of every departure from the type which heredity would produce, we find that modifications and variations are identical in being due to environmental causes. The former are changes in the body due to mutilation, disease, malnutrition, etc., and, having no effect on the germ cells are not transmissible. Variations on the other hand are developmental changes due to permanent changes in the germ cells from environmental causes, and appear in later generations. Mendel's discovery shows that the union of the male and female cells does not create anything new, since the characters are transmitted as indivisible units. If a harmful modification is not fatal it does not effect the species for it is an individual matter which disappears in the next generation, but a harmful variation may eliminate that type from the accumulation of injuries, generation to generation.

There was recently a discussion as to whether these permanent changes in the germ plasm are always minute and found in every generation, or whether they occur occasionally and in marked degree. DeVries championed the latter idea and said that evolution occurs by sudden jumps due to the appearance of these big variations which he called "mutations." It is now known that one of the plants he studied (a primrose) was a hybrid and that the changes he called variations are merely reversions. The drift is now back to the original idea of Darwin that variations are minute and evolution gradual. All the controversialists agree that the changes are due to causes acting on the germ plasm, and that they are purposeless, some being actually harmful, others of benefit, and the latter have the advantages in the competition for survival.

We need not discuss Mendel's laws, as they deal merely with the manner in which the various qualities of the two parents are segregated in the germ plasm and may appear as "dominant" in the offspring or be hidden as "recessive," and in later generations may not enter the germ plasm at all. The point we are to remember is that the germ plasm is composed of a piece of the germ plasm of each parent in different proportions.

There is then no mystery about heredity. The word merely means that germ plasm does the same things generation after generation as long as it is not chemically changed by something in the environment. The mystery is the manner in which a germ cell develops the body by multiplication and specialization of the cells and their arrangement into tissues and organs. Little is known of this process, though some progress has been made in explaining it. As it has no possible connection with the process we call heredity it does not concern us here.

Weismannism does not say what the modified germ cell will produce in its development by multiplication. That can never be foretold because of the almost infinite number of changes possible in such highly complex substance, formed of many groups of molecules each containing hundreds of thousands of atoms. The forms of body produced are legion, and some of them are fitter to survive than the others, which range around the fittest in accordance with the mathematical laws of probabilities. The great advantage of Weismannism is the way it settled the baseless idea that a modification of the body so influenced the germ cells in the ovaries or testicles that they would develop into a body possessing the same anomaly.

**Modifications
of Bacterial
Forms.**

It was also an advantage to learn that heredity in multicellular organisms was identically the same as in the unicellular such as bacteria which are so easily modified by the environment. In the latter we can readily see that all modifications or acquirements are transmitted because the body is the germ cell, and after division the cells or new organisms are merely the two halves of the parent. Bacteria are very easily modified by a new environment—indeed such change is the rule, and this susceptibility makes it possible for the bacteria to revert to the original form as soon as the original environment is restored. Regeneration is the rule, and this is a very vital matter in studying the degeneration which in the human species is accompanied by so much dental abnormality.

However, there are a few instances on record where such marked change has taken place in the protoplasm of bacteria and higher plants by a new environment that they have not been able to revert upon restor-

ation of the original environment, but remain what is practically a new species artificially produced. The smallpox germ which is probably a protozoon is also permanently changed by residence in the cow, and does not revert when it re-enters man. In this direction, research is now being directed with a view of producing vaccines for cure or prevention without the slightest risk of producing the original disease or any of its dangers or complications.

**Regeneration
Principle
in Man.**

In man regeneration is the rule even after considerable degeneration has been caused by adverse factors. That is, a man may have been so stunted or deformed in the developmental stage that we would presume the germ cells could not be normal,

and yet if his infant is properly fed and managed it may develop into a normal adult. Unfortunately the uterus of a degenerate woman is a bad home for an ovum which is liable to malnutrition or poisoning from the abnormal blood serum of the mother which nourishes it through the placental membranes. Hence the offspring may start extra-uterine life already damaged so greatly that it cannot develop properly. Degenerates thus may give birth to degenerates, but it is not fair to call this heredity. The germ cell may have entered the uterus in a perfectly normal condition, and may have been damaged by this adverse environment. It subsequently develops badly, but may not reproduce a single abnormality possessed by the mother or father.

**Influences
of Alcoholism.**

It is evident that maternal abnormality is far more effective in damaging an ovum than the paternal. This is specially evident when the mother is an alcoholic, for she poisons the germ ce'l's before conjugation with the male cells, and for nine months afterwards. Her children become progressively more and more degenerate, until the later ones are not viable. In the last stages she aborts ear'ier and earlier until sterility follows.

**Influences
of Syphilis.**

In syphilis the course of events is the exact opposite. Abortion is the rule in the early stages, but as the disease is cured the later pregnancies are longer and longer until the full term is reached but the child is not viable. In time perfectly normal children appear. This is merely an infection and has no relation to heredity—though we call it hereditary syphilis to show that the treponemas were obtained from a parent. It would be better to call it congenital or prenatal infection.

Degeneration.

By common consent the word degeneration is applied to those in whom the nervous system is at fault, and in our ignorance of the exact chemical

change which has taken place in the nerve protoplasm, we merely called it "instability," for this term expressed the most prominent characteristic. This change has first taken place in the germ cell probably from some kind of poisoning. Necessarily then it must be hereditary for at least one generation, for this damaged germ cell reproduces unstable germ cells like itself. The nervous system produced by such a damaged germ cell is so unstable that it may go wrong in any one of dozens of different ways, producing the great class of neurotics—people of every grade of intelligence from idiocy to genius, with every form of bodily defect or abnormality called the stigmata of degeneration, with every kind of nervous abnormality from hysteria to epilepsy, and specially prone to neuroses and insanity.

Now although the defect is in the germ cell and thus transmissible, it is not necessarily permanent. A congenital neurotic may possess sufficiently good and pure blood serum to restore his or her germ cells to a normal condition and his children may be perfectly normal especially if the conjugal partner is not neurotic. If both are neurotic the case is more or less hopeless for their direct descendants, though even in such cases regeneration of later generations may and often does occur. The tendency always is towards the normal. Only where the abnormal environment is continued and intensified do the lines tend towards extinction as Morel proved over a half century ago. The early writers on this subject were deceived into thinking that if in the worst cases with a permanently bad environment the course was progressively downward to idiocy and sterility, such was the rule when the environment was normal. They gave undue power to heredity and ignored the restoration effect of a good environment. We now know that the change in the germ plasm is not necessarily or even ever a permanency, but disappears or gets worse as the environment is good or bad. This would be a sad world if instability were permanent and even cumulative, for every family has more or less instability which would result in universal idiocy and sterility to end the race. The only thing really permanent in us is the normal. The good is hereditary and permanent, the bad temporary and non-transmissible as a rule.

**Influences
of Climate.** Morel himself was probably deceived by studying misplaced migrants who were in a climate to which they were physically unadjusted. Extinction is the invariable rule in such cases, and the time required depends upon the degree of unfitness. It may take only three generations as in the Anglo-Saxon in India; several generations as in the blond French in Louisiana; or several centuries as in the blond Homeric Greeks. The process is invariably accompanied by nervous instability

which is most marked in the blonds who wander from their normal cold, dark, northern climate to one which is hot and light, but the cause is the constant bombardment of adverse factors for which they have no physical protection such as pigment in the skin.

Arrest of Development. Very frequently the results of arrest of development are erroneously considered to be evidence of direct heredity when they appear in two or more successive generations. Any one of a thousand ad-

versities may check the growth and development of a young ovum, foetus, infant or adolescent, and the results vary according to the stage of development when the injury was received. Arrest may occur in one or several parts so that the children though dreadfully deformed may not have the same deformities as the parents—if the parents are at fault. Unfortunately the jaws are very prone to arrest of development from any of these causes, and the process is the same in all cases where the arrest is the same in time and degree. That is, if I am not greatly mistaken, the permanent teeth come in abnormally almost according to a rule instead of absolutely at haphazard. Thus it happens that certain deformities are found in two or more generations as though they were hereditary, whereas there may have been separate causes for each generation and no hereditary influence whatever.

A few years ago, dental deformities were considered an invariable sign of an hereditary nervous instability which rendered normal development impossible. It is no doubt true that a neurotic organism is easily disturbed by an injury which is harmless to the normal. Hence among the deformed there must be more neurotic types than in the population as a whole, but we have gradually drifted away from that extreme position and in every case we are searching for the special cause which pushed the organism out of the rut it would have followed if its normal heredity had been allowed to work out its destiny. We have long ceased to consider every degenerate a result of heredity. This has been proved by a study of the one bad specimen which now and then is found in a larger family of normal children. A French investigator has asserted that in every case where an idiot is found in a large family of normal children, it was discovered that something quite serious had happened to the mother about the time of conception or during early pregnancy—an attack of typhoid fever, pneumonia or whatnot. The ovum was poisoned by the bacterial toxins and the result is practically the same as in experimental poisoning of lower animals and plants.

**Influences
of Tuberculosis.**

It was announced some years ago, that the tuberculous gave birth to far more sexual perverts than the rest of the population. This sounds reasonable, as the toxins of the tubercle bacillus have a profound influence on the sexual system of the parent, and we could guess that they also affected that of the foetus. In such cases the mother is mostly at fault because she poisons the foetus for nine months, but an infected father must also have some effect as his spermatozooids are also poisoned.

Criminality. All these principles are illustrated in the curious changes in our opinions relative to criminals whose anti-social actions show that they are far from normal and must have been made abnormal by the environment. The ancient idea of mere viciousness was intensified when Lombroso stated that possibly thirty per cent. of criminals are born so, and that moral reform is impossible without reforming the brain and body. Then we shifted to the opposite opinion when we learned that fully 80 or 90 per cent. of young criminals could be morally reformed by proper institutional training and then lead a normal life of good citizenship. We concluded that crime was largely a matter of teaching in a bad environment. Then we shifted again when we found that in the Iowa State Penitentiary over ninety per cent. of the criminals came from respectable families. They had a good heredity and were raised in a presumably normal environment. Criminals give birth to very few criminals as the family life is impossible in their calling. The idea of sterilizing criminals to prevent the criminality of the next generation is sheer nonsense.

The truth as to the origin of criminals has only recently been found. Binet's test shows that they are almost invariably cases of arrest of brain development. They are mental children with the moral ideas normal to children or savages of their grade of development. Prostitutes are the female counterparts of the male criminal and are all more or less feeble minded. That is, something has happened to the parents to poison or injure the ovum and prevent its developing normally. Perhaps only one of a large family becomes a criminal, the rest having had normal development.

Present inquiries are in the direction of finding out what has happened to cause this arrest of development, whether an infection, poisoning by alcohol or other drug, poor nutrition, fatigue or any one of dozens of other adversities. My own personal inquiries have shown that the cumulative effects of a bad climatic environment cause inefficiency from neurasthenia, and that the type most out of adjustment to any one locality furnishes an undue proportion of paupers, criminals and insane. That

is, criminality is not hereditary but due to the damage of a bad environment before or after birth.

It is true that a case of arrested development will be more easily damaged by the environment than a normal child. We all know of prominent men who have done well even though born in the slums. If a family is so degenerate that it drifts to the slums, the next generation is generally more degenerate from the accumulated effects of the same causes and is later damaged by the slums also. The neurasthenic or unstable nervous system is transmitted as we have already explained, but it may result in genius not criminality, and in addition it may disappear in later generations if a perfectly normal environment is supplied immediately after birth.

Criminals show the effects of bad development in their physical anomalies. I once examined two or three hundred young criminals and found barely six who could pass the physical examination of a recruit in the army and navy. In only two were there no discoverable defects whatever. This seems to be the rule in all classes of abnormal men. The teeth in particular were very bad, both from neglect and defective development of the jaws. Soldiers are as nearly the average normal man as it is possible to get them, physically, morally and mentally. They contain fewer degenerates than any other class.

When the germ cell has been so seriously damaged that its development is checked soon enough to cause idiocy or imbecility, it seems impossible for a return to the normal in later generations. If feeble mindedness mates with feeble mindedness, all the children are feeble minded. In case of minor grades of the defect, mating with the normal may give some normal offspring, but the social burden of the others is so great that governments here and there are discussing the necessity of sterilizing all this class of defectives—a proposition which is sure to become law.

Heredity and Environment. The lesson to be derived from this résumé of the present status of the effect of heredity and environment, is this: Heredity means that an unchanged piece of the germ plasm of a normal parent must develop as the parent did, and if it departs markedly from the predestined groove, something in the environment has pushed it out. Arrested or perverted development of the jaws always has an environmental cause, generally prenatal, but it may be post natal from bad nutrition or disease. Moreover a good environment (including nutrition) may restore a baby to normality which seems drifting away from it. The cause may have happened in the grand parent, so profoundly affecting the germ cells as to interfere with their development unto the third or fourth generation by



a pseudo-inheritance. Finally the tendency of all organisms is to return to the normal specific form if the environment is restored to the normal, the exceptions being those rare cases where an entirely new germ plasm has been created by the environment.

It is very evident that an intensive inquiry into the family histories of cases seen by the orthodontists, will eventually result in finding the causes of the abnormalities of the teeth and be of immense benefit in prevention, not to mention the flood of light it will shed on the relative effect of heredity and environment. You will find that quite frequently, if not always, the worst cases of deformed or arrested jaws are in the types most out of adjustment to the climate. Blonds in light countries are great sufferers from this as well as other abnormalities.

The far-reaching and permanent effects of mal-nutrition during development must be particularly studied, for we have been in error in supposing that

Malnutrition. a temporary check to development and growth is always repaired later. During typhoid fever or any long sickness, the hair is improperly nourished, so that when the growth starts again there is a weak spot in the hair which breaks off at that point, constituting the well-known phenomenon of falling of the hair. Similarly the finger nails are starved and in this part of the nail is a transverse groove which can be recognized until it grows out to the end and is cut off. Other growing cells exhibit a similar phenomenon. Only a few years ago it was found that if a young child is seriously checked in growth by a long period of semi-starvation from disease or improper feeding, it never regains the condition its heredity would have given it. Mentally such children may be below par all their lives. These cases have rather inclined us to the view that undernutrition is the cause of the feeble mindedness which is the real basis for most prostitution and criminality. If the child is in a good environment, it may be taught to be good just as we can teach a horse or dog to behave in a certain way, but if it falls into bad associations which do not necessarily injure a moral man, it is most sure to drift into crime and prostitution.

An investigation of a few cases in which only four teeth in a child were carious and the other sixteen perfect, revealed the fact that a sickness such as a serious enteritis had long prostrated each one about the time the crowns of the four teeth were growing in the gums. I am convinced that some such explanation can be found for the frequency with which the first permanent molars are of defective material or even carious on eruption.

The period at which these crowns grow is one in which the child goes through repeated prostrations of the various infections, such as

mumps, measles and whooping cough, all of which are now known to be exceedingly serious in their effects upon the organism, interfering with its nutrition as well as poisoning it. Prenatal syphilis affects only the crowns as a rule and the first erupted. Surely the atrociously decayed teeth of the children of the slums are largely due to bad feeding, for the crowns which develop in the gums during lactation are far better than those which develop afterwards. We must remember that a large percentage of slum children are anaemic, small and chronically hungry. Dental cleanliness unquestionably prevents much of this decay, but it does not repair bad material. Savages are well fed as a rule and their teeth are usually normal and not subject to decay in spite of lack of cleanliness.

Recent work at the Wisconsin Experimental Station shows that the size of mammals at birth is a matter of heredity, and is not altered by maternal feeding, though, of course, malnutrition or infections of the mother greatly affect it. That is, the new born of a species are remarkably alike as their respective environments have been the same. Changes in tooth development come later with bad environments.

I see by the program that the internal secretions are receiving long deserved attention since they have been proved to be the cause of much other deformity, if in excess or deficiency. It is interesting to note that an English writer has collected data showing that hypo-thyroidism is an after effect of intestinal intoxication which in turn has been traced to an origin in pus foci at the orifices of the body, chiefly the teeth, and thus we have a closed chain, as in many another syndrome, having no relation to heredity. Scarlet fever has also been blamed for hypo-thyroidism resulting in cretanism and its disturbed dentition.

Another factor, whose effect is still unknown, is the intermittency of growth. This was discovered many years ago in the Russian military schools, and it was also found that during the periods of growth the child was so lazy and stupid that the usual tasks and studies had to be partly abandoned. It made better progress in the end if it ran wild a few months, for pushing at a time when rest was imperative only retarded it.* It is therefore quite likely that during those periods when the bones and connective tissues are taking all the nourishment, the teeth as well as the brain cells are suffering privation. I have been told that the rapid growth of the jaws and body after certain orthodontic work may be due to these periods and have no relation to the surgery. Unquestionably better mastication after regulation will improve general nutrition as in the case of any other dental work, but we must be on guard to avoid mistaking "post hoc" for "propter hoc." Marvellous moral improvement oc-

**The Strand Magazine*, November, 1900.

curs in young criminals when their nutrition is improved by any means, but it is wrong to state that bad mastication or the absorption of pus from defective teeth is the sole cause or even the principal cause of their waywardness, as recently asserted. The same plea was made by ophthalmologists a few years back, but eye defects are now known to be only contributory causes which are more or less harmless in the stable and well fed.

We can now revise our opinions of the cause of lack of harmony between the size of the teeth and size of the jaws. Jackson voices the old theory of inheritance of jaws from one parent or race and teeth from another, while Angle says that there is no substantial basis for this idea of heredity. I do not know of any statistical studies of the number of cases of disharmony which have been correlated with the existence of a small jaw in one parent and large teeth in the other. I doubt whether even under Mendel's laws of the segregation of character, such disharmony is possible. Whether a character is dominant or recessive, there is generally, if not always, harmonious development in all hybrids. In a mule, for instance, we never see the appearance of the small jaw of one parent and big teeth of the other or vice versa. The big ears of the ass are dominant, but their relation to the big head is harmonious.

In time we will always be able to find the cause of every departure from the normal—generally it is post natal, often in the parent, sometimes in the grand parent, and very rarely earlier. We will find that abnormalities themselves are not transmissible, but that the germ plasm being continuous will repeat what has been done in prior generations unless the environment changes it. We must cease to refer abnormalities to a mystical heredity and unpreventable results of the will of God, but consider them as material results of material causes which are largely avoidable. The subject is really one for preventive medicine.





Restoration of the Normal Masticatory Function of Decayed Teeth.

By A. H. KETCHAM, D.D.S., Denver, Colorado.

Read before the Texas State Dental Association, Fort Worth, Texas, April 16, 1914.

Introduction.

In the ITEMS OF INTEREST for May, 1913, there appeared a most excellent paper, "Restoration of Occlusion by the Casting Process," by Dr. J. Lowe Young, of New York City; also a valuable discussion by Dr. R. Ottolengui and others.

Drs. Young and Ottolengui kindly loaned the speaker the fillings, models, etc., used to illustrate this paper and its discussion, and a synopsis was given in Denver, Colorado Springs, Boulder, and Fort Collins last fall. The results of these lectures are shown by some of the illustrations in this paper; also by the large collection of inlay, crown, bridge and amalgam restorations which will be shown on Friday as a clinic by Dr. Arnold, of Houston, along with some of his own restorations. Drs. Young and Ottolengui have sent lantern slides used to illustrate their lectures; those of Dr. Young's have just arrived from Detroit, where he gave a lecture on April 9th before the Michigan State Dental Society.

You may wonder why an orthodontist should presume to instruct dentists upon the shaping of the occlusal surfaces of their restorations. The answer is that the successful orthodontist must be a student of occlusion. Years ago the great Bonwill preached occlusion and demonstrated the fact of normal occlusion. Listening to one of Dr. Bonwill's lectures was a young man who had a great desire for accurate, scientific knowledge, who was willing to labor and even to sacrifice health and

financial gain for the sake of determining the truth. This young man said: "If this is normal occlusion, then I can classify malocclusion." Shortly afterwards Dr. Edward H. Angle's classification of malocclusion of the teeth, based upon occlusion, was given to the profession. To quote Dr. Young:



Fig. 1.

"Normal occlusion then became the basis of the classification and diagnosis of all cases and immediately placed orthodontia upon a scientific foundation, which fact mainly has enabled it to advance with such rapid strides during the last fifteen years.

"For the orthodontist to correct malocclusion he must of necessity have a clear and definite understanding of this ideal condition which he is attempting to restore. Thus it is that normal occlusion is the one supreme picture which the orthodontist has in mind; the beginning and the end of his anticipation of treatment, the ideal which governs the daily progress of correction of malocclusion; the standard in occlusal relations which above all it is desirable to obtain"*

Having been a student of occlusion for twelve years since first studying with Dr. Angle, I am convinced that in order to serve the public well the general practitioner of dentistry needs an understanding of occlusion even to a greater degree than does the orthodontist. And looking

*ITEMS OF INTEREST, May, 1913, Page 345.

back over many consultations with dentists doing general practice, I believe that they are inclined to consider a knowledge of occlusion as belonging to a special field. Thus they do not study into the minute anatomical construction as they should, seemingly feeling that a consideration of occlusion does not apply to the filling of teeth as closely as to the treatment of malocclusion.

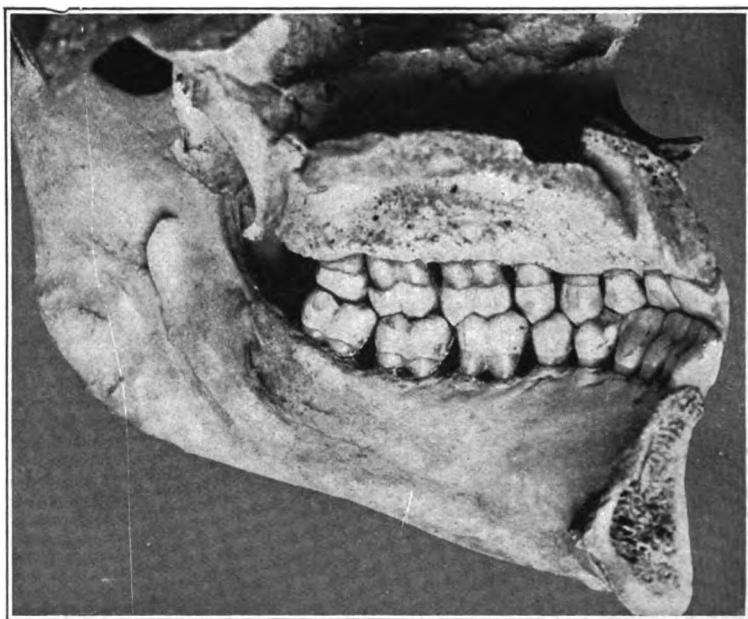


Fig. 8 (Turner)

**Knowledge of
Occlusion Needed
by Dentists.**

I am well aware that in filling teeth the dentist is often contending with problems of malocclusion, but this makes a knowledge of what constitutes normal occlusion all the more necessary. Let us for a moment study the buccal relations of the human teeth (Fig. 1). You will notice that the lower buccal teeth are one cusp in advance of the upper, and that the upper buccal teeth occlude one inclined plane outside the lower. This arrangement of the teeth has been handed down from the reptile ancestors of mammals. To quote Prof. Raymond C. Osburn, of Columbia University:

"The relation of the cusps of opposing teeth is constant and is of a very ancient order. The oldest date back to the beginning of the tri-

tuberculates, from which the primates as well as probably all other existing orders of mammals have originated; and even the youngest date back to the early primates of the lower Eocene period—a matter of some four million years, according to Walcott. In all this lapse of time, neither the general features of the occlusion nor the number, nor yet the arrangement of the cusps, has suffered any material change in the primate series leading up to man. If efficiency may be judged by stability, consider how perfect must be the dental arrangement which has persisted almost unchanged through years that can only be measured by the millions.”*



Figs. 3 and 4.

If the order and arrangement of the teeth have persisted through these millions of years, is not the orthodontist or dentist who would ignore this arrangement assuming grave responsibility? Many dentists become confused when asked if the upper and lower teeth in a certain case are in their normal mesio-distal relations. Now this is very easy to determine by simply noticing the key of occlusion—the mesio-buccal cusp of the upper first molar—and noting whether it is seated in the buccal groove between the mesio-buccal and disto-buccal cusps of the lower first molar; then noticing whether the upper cuspid is received between the lower cuspid and first bicuspid. The same relations are found when these teeth are viewed from their lingual surfaces (Fig. 2).

**Saving Teeth
not Sufficient.**

For years the idea has been prevalent among members of the dental profession that they have reached the highest pinnacle in their calling when they are able to save teeth. Since the delivery of Dr. Young's paper the profession has advanced beyond this point to that of not only saving teeth, but of restoring the entire denture to a normal working condition, where the teeth may in unison exercise their function of efficiently masticating food; thus, in our field, the entrance to the alimentary canal, we secure a nearer approach to that 100 per cent. efficiency which we should all strive to produce.

**Dental Cosmos*, December, 1913, page 1340.

To make anatomical restorations we must not only study the teeth as a whole, but we must be intimately familiar with the surfaces of each tooth.

The artist, with a few strokes of his brush or crayon, makes certain graceful lines and curves, which, if he is drawing a horse, will indicate speed, as in the race-horse; or, by more sturdy lines he makes a drawing indicating strength without speed, and thus we have a work-horse. This

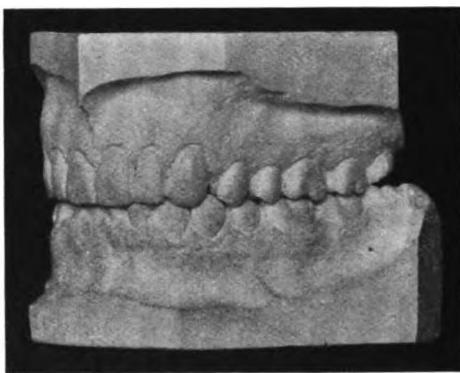


Fig. 5.

result is only possible through intimate knowledge of the anatomy of the horse. The dentist, if he would make true restorations, must be just as familiar with all the different types of teeth.

Dr. G. V. Black, in his "Dental Anatomy," has described the surfaces of the teeth with a minuteness and accuracy of detail which is marvelous (Figs. 3 and 4). We should do as he recommends while studying dental anatomy, viz., have a number of extracted teeth of the kind and denomination we are studying at hand. Not only this, but we should study all the skulls containing teeth and all the models of teeth we can obtain, and not only study the surfaces of the teeth, but their relations when in occlusion (Figs. 5 and 6).

Restoration of Masticatory Efficiency.

It seems to the essayist that too often dentists when examining mouths look at the teeth as individual units, and think only of how best to fill, treat, or crown a tooth; that they seldom have a mental picture of the teeth as a whole, comprising an efficient machine for the grinding of food. I wish to emphasize the importance of making models of each and every case which requires more than the

most simple restoration, and then the study of these models in relation to the possibility of improving the efficiency of the teeth in masticating food. The patient should be shown the models and the advantages pointed out which may be expected from anatomical restoration, remembering



(Fig. 6 (Young)

that in the normal set of teeth there are one hundred and thirty-four inclined planes in occlusion.”*

**Relation and
Purpose of
Molar Cusps.**

A study of the molars in occlusion shows that the mesio-lingual cusp of the upper molar occludes in the fossa of the lower molar, where it strikes four cusps, and the disto-buccal cusp of the lower molar occludes in the central fossa of the upper molar,

*Dr. H. C. Ferris.



where it strikes three cusps (Fig. 7). These form the millstones which grind the starchy foods, while the other cusps and inclined planes of the molars and of the premolars form crushing and tearing instruments for the reduction of meats and fibrous foods. When the lower teeth are too far forward or too far backward in their relation to the upper teeth, the mesio-lingual cusp of the upper molar and disto-buccal cusp of the lower



Fig. 7.

molar are brought into antagonism with approximal ridges. Thus the cusps and fossae of the molars which grind the starchy foods are brought into relation with cusps and inclined planes which do not have the mechanical form necessary for the grinding of starchy foods, and the masticating machine cannot properly prepare food for digestion.

Some human dentures have buccal teeth with long cusps and correspondingly long overbite in the incisive region; others have buccal teeth with short cusps and near end-to-end bite in the incisive region. In the first case the lateral mandibular movement is not as near a horizontal plane as in the latter case. We find these conditions down through the lower order of animals. In the carnivora with long cusped teeth, made for cutting and tearing flesh from bone (Fig. 8), there is only a vertical movement of the mandible; while at the other extreme, in the herbivora, there is a nearly flat cusp molar tooth and the widest range of horizontal movement of the mandible. In the latter the molar is spread out laterally to take advantage of the sidewise movement of the mandible so necessary to the grinding of refractory vegetable fibre. The surfaces of these teeth are divided into transverse ridges of enamel with valleys of dentin and cementum between. In the elephant, which has a backward and for-

ward movement of the mandible (Fig. 9)* as well as lateral, the plates of enamel are arranged in lozenge-shaped patterns, so that the food is ground whether the mandible is moved laterally or transversely.

According to comparative dental anatomists, food and fighting have dictated tooth forms. Therefore the teeth of the panther seal shown in Fig. 8, and those of African and Indian elephants shown in Fig. 9, have each been developed from the original cone-shape tooth through survival of animals in each class having teeth which have been evolved into a form



Fig. 8.



Fig. 9.

best adapted for the preparation of their food for digestion. An omnivorous diet has produced the efficient human teeth; the forms of part of our teeth being adapted to the preparation of one class of food for digestion and the forms of other teeth being especially adapted to the reduction of an entirely different class of food. How necessary then is it that the dentist should be thoroughly familiar with the most minute anatomy of all surfaces of each and every tooth, as well as with the function of each.

**Importance of
Copying Teeth
of the Patient.**

I wish to emphasize the fact that restorations for any given case should be carved so as to be of the same type as the natural teeth in that mouth; that the fossae and fissures should be no shallower nor any deeper than in the other teeth. The cusps and ridges should be no higher nor lower than the other units in that mouth, and when I say in that mouth I mean for that day; not as the cusps were before they were affected by wear, nor as they will be in years to come; but they should be made typical for that mouth at that time. Of course, this rule is

*Figs. 8 and 9 from Hopwell-Smith's "Dental Anatomy and Physiology."

sometimes modified by malocclusion, or by the teeth tipping and drifting or lengthening from the loss of tooth structure. These conditions must be taken into consideration, and a restoration, the nearest approach to typical form for that person, at that time, that it is possible to make under the circumstances, should be constructed. To illustrate this I show an amalgam restoration in an abraded tooth (Fig. 10), by Dr. R. A. Adams.

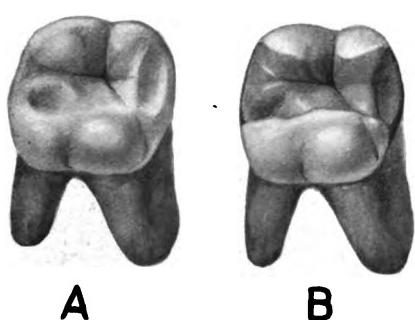


Fig. 10.
A. Shows an abraded natural tooth.
B. Shows imitation of same in amalgam.

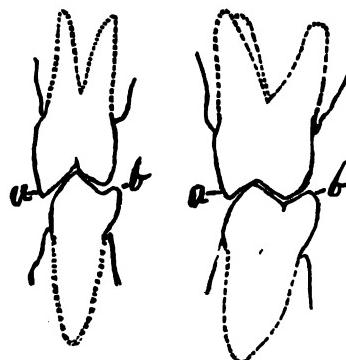


Fig. 11.
(Black)

When the teeth are in occlusion the tip of the cusp resting in the fossa should not quite reach to the bottom of the fissure. Dr. Black has described this most minutely, as you will see by Fig. 11.

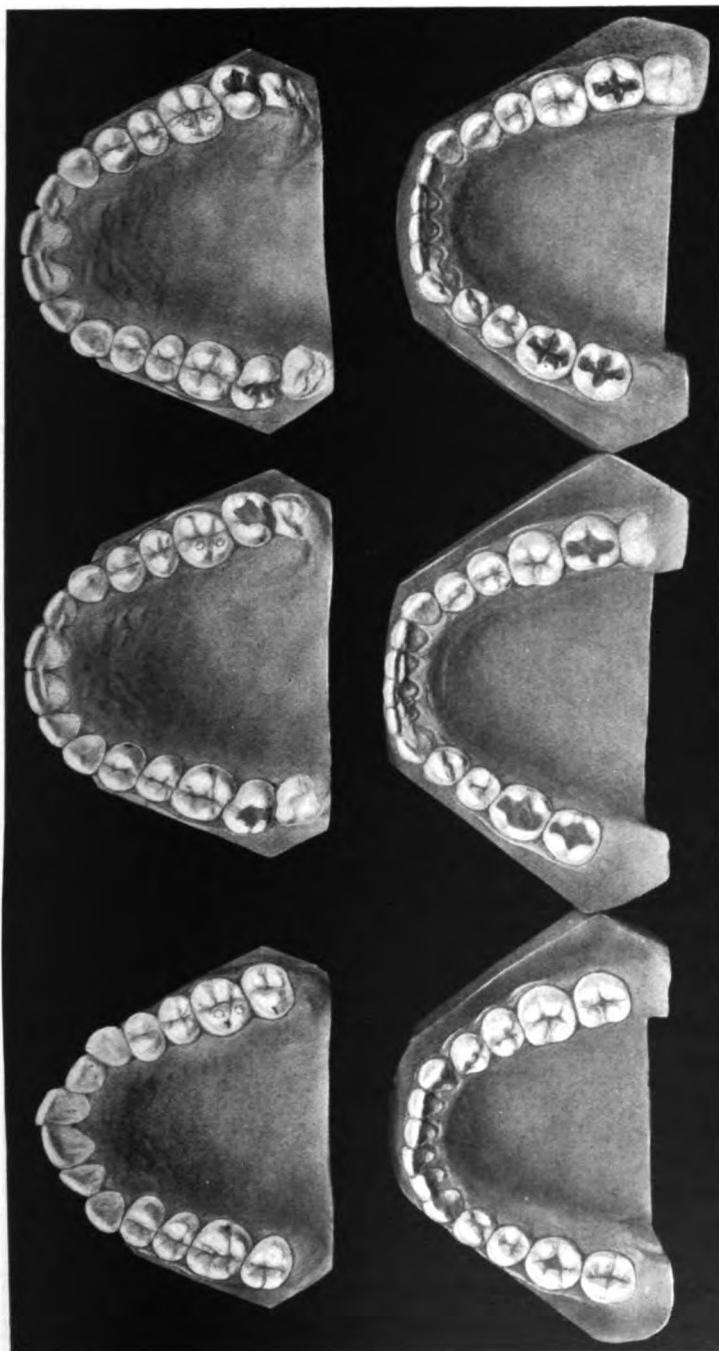
When the fossa is filled until nearly obliterated, the point of the occluding cusp hammers in the centre of the restoration. More stress is placed upon the walls of the tooth than if the fossa was of normal depth.

Some operators advocate a shortening of the cusps, especially in a pulpless tooth, so that when in use they do not touch the occluding teeth.

Think how empirical this practice is when compared with that of restoring shortened tooth cusps to normal length, form and function by the restoration. Some orthodontists are just as ignorant of tooth forms as the operative dentist, and when they place the teeth in occlusion allow bands to partly cover the cusps of some of the buccal teeth, and in cementing these fill the fossae full of cement, so that the teeth cannot settle into normal positions.

**Interest of
Orthodontists in
Dental Restorations.**

The orthodontist is vitally interested in the subject of anatomical restorations. In a case where originally the arches were constricted and in treatment the buccal teeth have been brought out into harmony with the line of occlusion, where they may



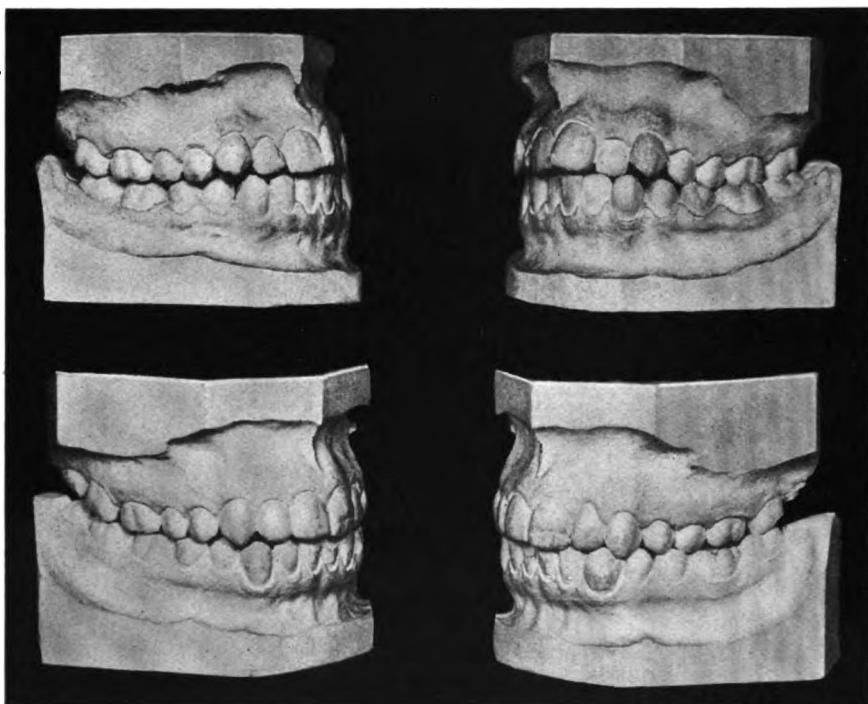
September 7, 1909.

Fig. 12.
July 6, 1913.

September 16, 1913.

Feb.

settle until locking of the cusps in occlusion retains the case, if the fossae of the buccal teeth have been obliterated by flat restorations, the teeth will slip and slide over these restorations back toward their former positions of malocclusion, and in cases where the mandibular teeth have been distal or mesial to normal they may slip toward the former malocclusion.



Upper casts, Sept. 7, 1909.

Fig. 13.

Lower casts, July 6, 1918.

**Cases from
Practice.**

The case illustrated in Figs. 12 and 13 emphasizes the point just made; by the first set of models you will see the depth of fossae and length of cusps before the teeth were filled, and note that the buccal teeth upon the left upper side were in lingual occlusion. The second set of models in Fig. 12 shows the teeth after the maxillary arch was expanded, and in the meantime some of the usual flat fillings have been inserted. You will note that in the upper second molars, especially the one upon the left side, the surface of the inlay is convex; of course, such a restoration does not permit the second molars in erupting to fully lengthen and settle into occlusion. The third set of molars show these

inlays and fillings after they have been carved with small inverted cone and bud-shaped burs, and minute cavity finishing stones in the engine. Such a procedure, however, is not recommended, as it is impossible to do the carving as well in the gold as it may be done in wax or amalgam: then, too, the bottoms of the fissures are left rounding instead of at a

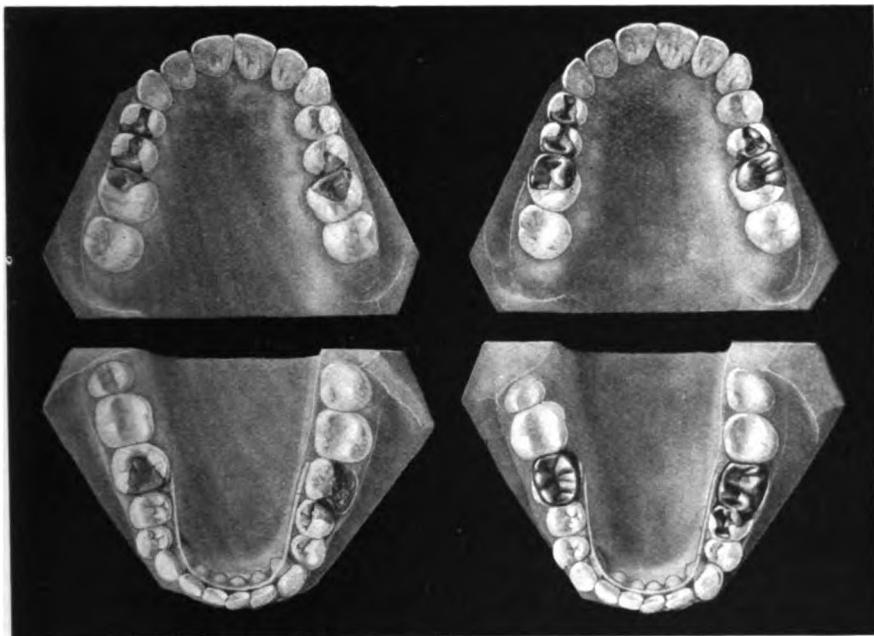


Fig. 14.

NOTE—The second and third lower molars are sound teeth, but models are poor.

Fig. 15.

sharp angle, as in the natural tooth. This rounding shape retains some starchy foods in the fissures; then there is liability of uncovering the cavity margins; but I think you will agree with me that the condition as shown in the third set of models is much better than that in the second. In fact, the patient reports that the grinding of food has been very materially improved by this procedure. The left upper first molar has given much trouble during retention by slipping lingually over the flat inlay which filled the lower first molar fossa almost level with the cusps. The lingual cusps of the upper molar have been worn from striking the lower molar in malocclusion, so when the retaining band on this tooth may be safely removed these cusps must be restored and the mesio-lingual cusp shaped so as to lock in the lower molar fossa when the teeth are in occlusion.

Models of a case in which the orthodontist produced great expansion of the arches are shown in Fig. 14. The patient was referred to the essayist for removal of the retainers. Observe the abraded molar cusps as shown by the first molars, also the flat inlays. In this condition these teeth would not lock and would soon return, at least part way, toward

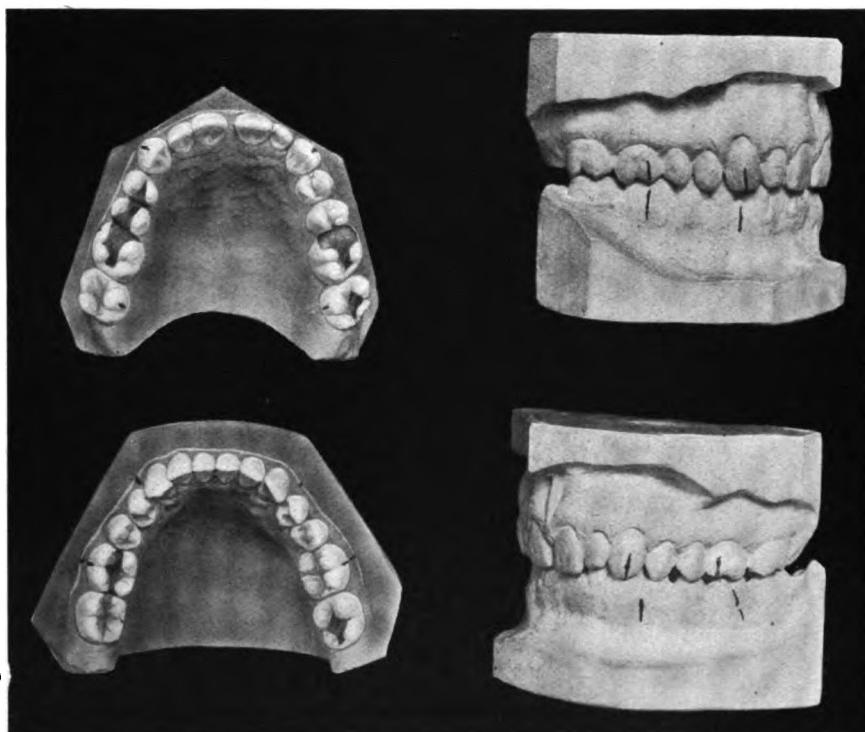


Fig. 16.

their old positions of lingual occlusion. The young man's dentist (Dr. L. B. Morris) was asked to construct anatomical restorations. The result is shown by the models in Fig. 15. You will notice that the mesio-buccal cusps of the upper first molars—especially the one on the left side—have been built rather long. It was fully expected that these would occasion some discomfort in the lateral movements of the mandible, but the day after insertion the patient reported that the restorations "are as comfortable as old shoes—I can eat with them just fine, but cannot remember the time when I could masticate my food well before this."

Observe the lack of approximal ridges in the inlays in Fig. 14, the occlusal surfaces slanting toward the approximal spaces, thus forcing food away from the grinding surfaces of the teeth on to the gum septum

between the teeth. Compare with these the new restorations in Fig. 15; notice the high approximal marginal ridges with the inclined planes slanting toward the occlusal surfaces of the tooth. Think what this means in forcing the food away from the approximal space toward the *mill*, where it may be properly prepared for digestion. Right here is a great lesson in efficiency, and one which will appeal to every intelligent patient.

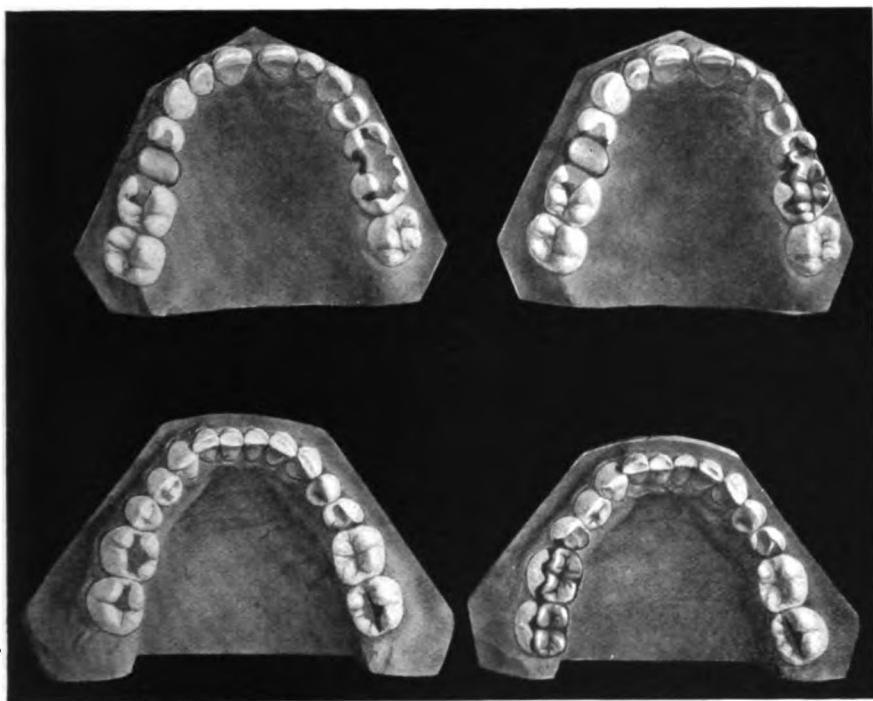


Fig. 17.

The operative dentist by inserting flat fillings may not only undo the work of the years which the orthodontist has spent to put teeth in occlusion, but in a normal mouth may induce maloclusion by making it possible for the teeth to slip and slide over the flat surfaces.

The essayist can speak feelingly upon the subject of flat fillings, for he has had personal experience. Fig. 16 shows models made twelve years ago. Upon the left side of mouth the buccal teeth are in end-to-end occlusion, while upon the right side the teeth are in normal occlusion. At the time when this model was made the left upper first molar contained a mesial-occlusal gold foil filling, which had been hammered to place by an exceptionally skillful foil worker. You will notice that the mesio-buccal cusp of this tooth had been left short. Upon the

normal side the upper premolars and first molar contain foil fillings. These were made in the days when fillings were put in for the sole purpose of saving teeth, and little attention was paid to approximal contact and none to occlusion. As a result, food packed in between these teeth, causing absorption of the gum tissue. The models on the left in Fig. 17 show the condition of these teeth in 1913. Since the first models were made special attention has been given to the contact point, therefore the

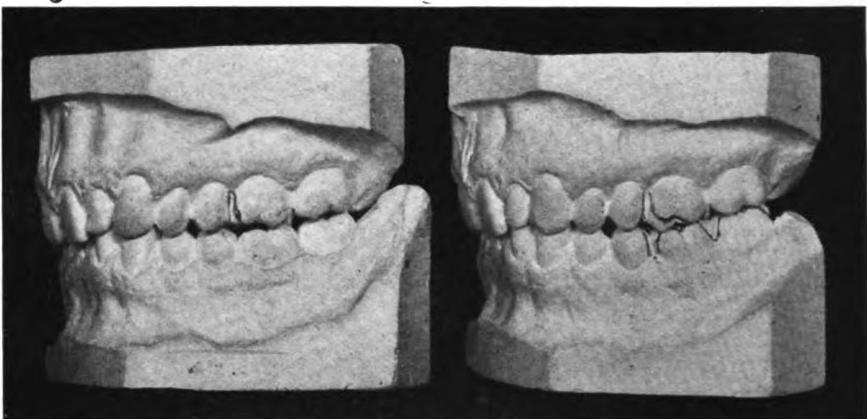


Fig. 18.

restoration in right upper second premolar was built out to closely touch the foil fillings in adjoining teeth. Notice the shape of the occlusal surface of this restoration. You will see there is a high ridge where there should be a fossa. This is caused by the inlay wax pressing between the occluding teeth when closing the mouth in the first stages of preparing the wax pattern. You will notice that the cusps of these teeth are quite long. Now notice the buccal cusp of the right lower second premolar. It has been shortened, not from wear in use, but by grinding. This was done so that the long cusp would not pack food between the upper teeth. This shows quite plainly our empirical knowledge in regard to occlusion, to cusp length, and angle of inclined planes in relation to occlusion. You can see that in lateral motions of the mandible in dividing food that this cusp does not touch and is of no use excepting in up and down motions of the jaw.

The models on right of Fig. 17 show the condition of the buccal teeth on left side of mouth after an attempt to restore the occlusion with anatomically carved inlays by Dr. Lynn Mathews. I want to make the point clear that we cannot correct malocclusion with anatomical restorations, but sometimes we can improve the occlusion.

The efficiency of the left molars (Fig. 18) has been improved until they are nearly as good as those on the right, but as the premolars occlude end-to-end they have been improved but little. As soon as time will permit, all the fillings and inlays upon the right side of the mouth will be replaced by anatomically carved restorations. Notice on the right side of the mouth, the lower first molar is not mutilated; that it has never needed a filling.

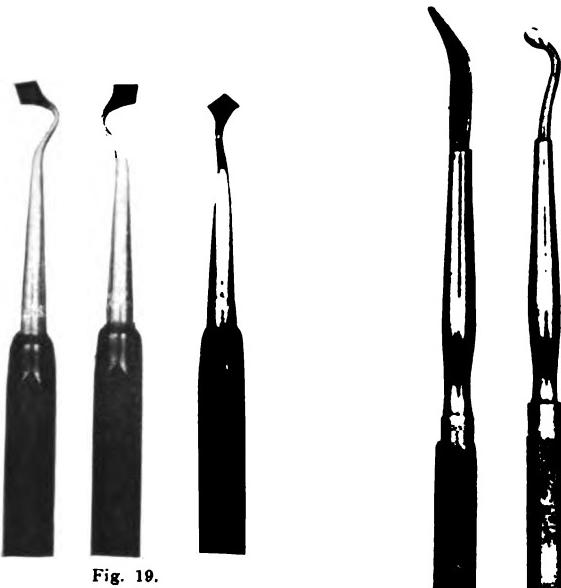


Fig. 19.

Fig. 20.

Technic.

I have pointed out the advantages of shaping restorations to reproduce the lost occlusal surfaces of the teeth, and this paper would be incomplete without giving the technic for carving, which may be mastered with a little study and application, so that the cusps, ridges, fossae and fissures may be reproduced accurately, easily, and quickly, either in wax or in amalgam.

Two good papers have recently appeared upon the carving of amalgam fillings, one by Dr. Wm. R. Pond, in January, 1914, *ITEMS OF INTEREST*, and one by Dr. Frederick Frahm, in April, 1914, *ITEMS OF INTEREST*.

I have been unable to find carving instruments on the market which will do this work either in or out of the mouth, accurately, easily and quickly. Fig. 19 shows a set of instruments designed by Dr. Frederick



Frahm, of Denver. They consist of three cutting instruments, all having the same kind of flat, two-edged blade, but with the shank bent at different angles, one right, one left, and one with the blade in the same plane as the shank. These in the illustration have cutting edges meeting

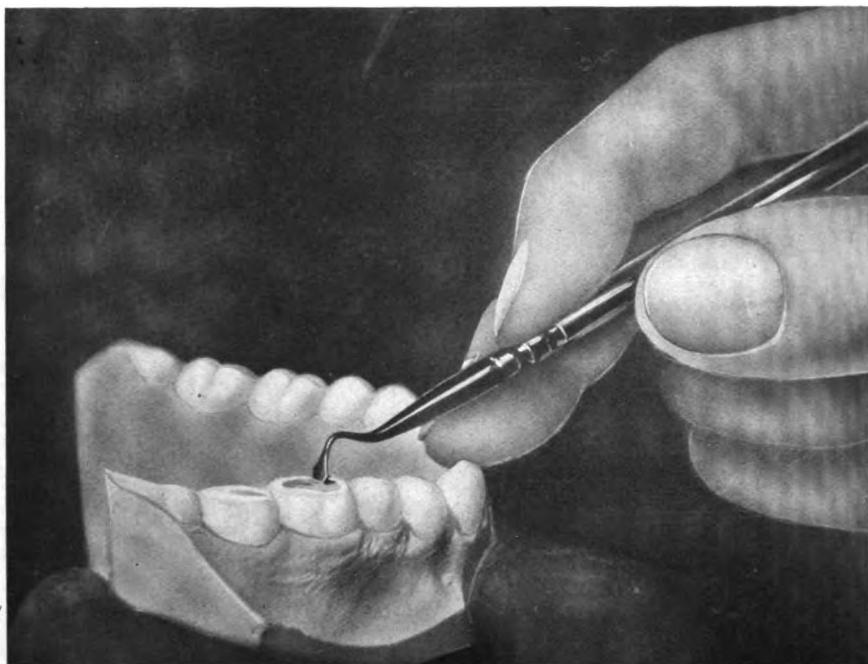


Fig. 21.

at an angle of ninety degrees. This angle is of the greatest use, as more teeth are found with the occlusal inclined planes which slant toward the fossae, meeting at this angle, than at any other. The complete set consists of nine instruments, the other two sets differing from this only in that in the first the edges of the blades meet at an angle of seventy-five degrees, and in the third they meet at an angle of one hundred and five degrees.

The technic of using these instruments, whether in the mouth or upon the model, is as follows: In the case of the lower first molar, with a restoration filling the fossa, select the straight instrument, holding as illustrated in Fig. 21. Place the blade opposite the point where the buccal fissure joins the central fissure (*a* Fig. 22); the instrument is imbedded in the wax or amalgam to full depth of fissure. Draw the instrument for-

ward, both inclines of blade cutting to full depth and width of fissure until the anterior occlusal fossa is reached (at *b*), then take either right or left instrument, according to position of tooth, place it in the fossa end of the buccal fissure (*a*), pass toward buccal side with blade following line of the fissure and buccal groove, raising as end of fissure is reached at (*c*) ; then take the straight instrument again, place in centre of occlusal fissure and cut diagonally backward and lingually to the point of junction of lingual fissure with central pit (*d*) ; then selecting either right or left instrument cut lingual occlusal fissure same as buccal (*e*). Now take straight instrument and cut from lingual pit (*d*) distally to the juncture of the distal with the disto-buccal fissure (*f*). Then to finish

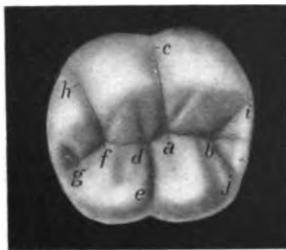


Fig. 22.

these select a right or left instrument, according to position, placing instrument in distal pit (*f*) and cut buccally and then lingually to points *g* and *h*, keeping one edge of cutting blade resting upon cavity margin, or, in the case of a compound filling, upon the matrix ; or, in the case of a wax inlay, it may be held at just the right angle to cut and leave the proper height distal cusp. To finish the mesial marginal pit, use right and left instruments, cutting buccally and lingually from centre (*b*) of pit to *i* and *j*. After this the supplemental developmental fissures are put in by sidewise pressure of the instrument. The occlusal surface of the wax is left smooth and polished by these instruments, which are used cold. In using these instruments on an occlusal surface, begin to cut in a pit and end in a pit, raising the instrument if going over a ridge. In finishing buccal and lingual fissures decrease pressure as instrument approaches end of fissure. In premolars start in one pit and cut toward triangular ridge, releasing pressure when passing over the ridge, then increase pressure toward other pit, either with draw or push cut. Finish marginal ridge and pits same as in lower molars. In carving restorations in the upper molars, the same technic prevails, only modified for the anatomy of the tooth. No subsequent polishing of the filling with a rotary cutting instrument is permissible. In fact, the only finishing that

is needed is burnishing with a tantalum instrument, which is harder than steel. One of these (Fig. 20, Right) is recommended by Dr. Young, and the other is a regular synthetic cement burnisher. The latter may be used with a forward and backward motion in burnishing the bottom of the fissures.

If there are tiny bubbles of gold in the fissure they may be trimmed with an S. S. White No. 48 chisel, which should be kept very sharp. If any portion of the inlay is high it must be upon the cusps or ridges and is easily trimmed. Right here a great deal of time is saved, for with

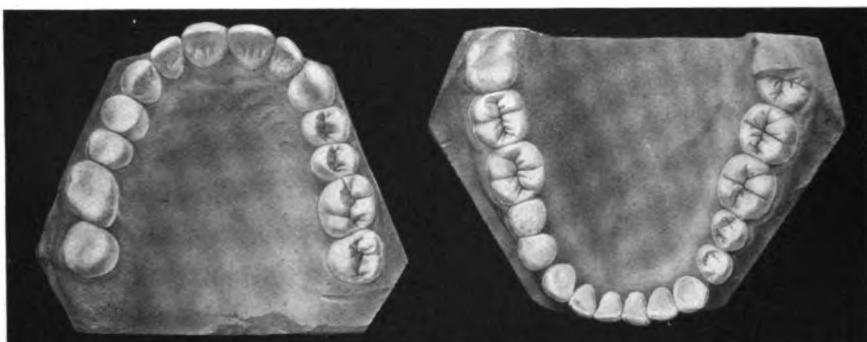


Fig. 23.

flat inlays often considerable time is spent grinding until low enough. Besides, the usual time spent in polishing a flat filling is also saved. In the case of amalgam fillings, Dr. Frahm believes that the carving should be finished before the amalgam sets enough to admit a squeaky sound beneath the instrument. This leaves the amalgam with a dull burnished surface. After it is hardened it may be gone over with the carving instrument and burnished fairly bright. These instruments are not on the market and when first used by an operator unfamiliar with the technique seem rather strange. Dr. Frahm made a set for the writer. These have been loaned to a number of dentists, who at first looked at them in a rather doubtful way, but after a few days' use they have felt they could not do without them, and have persuaded Dr. Frahm to make other sets.

**Carving
Wax Inlays.**

In regard to carving inlay wax: I am aware there are two methods of making inlays, one called the direct, from the fact that the inlay wax is prepared in the tooth cavity, then removed and invested; the other is called the indirect method, from the fact that the inlay wax is prepared in a model of the cavity. One of my friends follows the direct method, but after removing the inlay wax from the tooth cavity,

sometimes invests only the cavity side of the wax pattern; then after removing the sprue wire from the occlusal surface shapes that surface automatically; then placing a small sprue wire on the approximal surface or the tip of a cusp, finishes the investment in the flask. This works fairly well for small restorations, but is inaccurate in large restorations as one does not have the occlusal surfaces of adjoining teeth as a guide. I asked the doctor to place two sprue wires not over one-fourth inch in



Fig. 24.
Lower jaw teeth.
Old amalgam fillings replaced by new amalgam fillings.

Fig. 25.

length in the occlusal surface of the wax in a M. O. D. cavity, then to take a plaster impression. He followed my suggestion and the inlay wax was removed in the impression. I varnished the impression the same as for an orthodontia model, first giving it a coat of thin shellac varnish—being careful not to touch the inlay wax—which fills the pores of the plaster and acts as a primer, or as a first coat of paint on wood. After this was dried another coat of shellac was applied, which left a dull, glossy surface. When this was hard, a thin coat of sandrac was added. This left a glossy surface, yet the varnish was not thick enough to destroy the fine detail of fissures, fossae, ridges and cusps on adjoining teeth. Then the model was poured with the regular investing material. This was allowed to harden thoroughly, then the impression was removed in small pieces. A modelling compound bite had been taken which gave both the upper and lower teeth on that side in occlusion. Models were poured and allowed to extend beyond the anterior and posterior ends of the bite, so that when the model was separated from the compound impression the surplus plaster at the ends was fractured. By observing the fractured lines the models were put together in their correct relations. By noting the occlusion of the teeth in the bite models, then placing the models of the occluding teeth on the model of investing material, in exactly the same relation that it occupied on the bite model, then placing both in a

crown and bridge anatomical articulator (in this instance a Kerr), the inlay wax may be carved and occlusion noted accurately. The essayist has found that when taking a bite in wax or modelling compound, as a guide for the placing of two models together, that it is impossible to crowd the occluding models which have been made down into this bite.



Fig. 26.



Fig. 27.

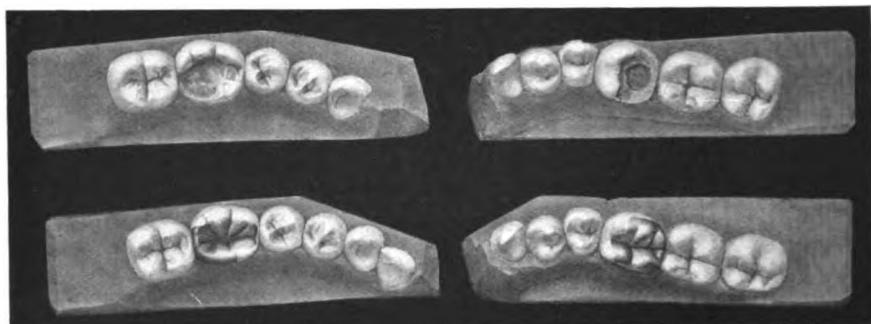


Fig. 28.

Therefore, he suggests this way out of the difficulty, though he feels that this technique can be greatly improved. After the inlay wax is carved the investment material model is soaked in water, then the model cut down until only the tooth holding the inlay wax remains. The surface of the investment material is well roughened and fine sprue wires placed, either in the approximal surfaces or on the tip of a cusp, or both, then invested in the usual manner.

The essayist believes that after experience with Dr. Frahm's instruments in carving amalgam in the mouth, that the operator will soon develop his technic to a point where he will carve his wax patterns accurately in the mouth, thus saving time.

Models for Carving Technic.

Practice in carving will quickly improve the operator's technic. The essayist suggests taking impressions of mouths where the surface of the teeth upon one side of the mouth are normal; then the occlusal surfaces of the teeth upon the side which



least approaches the normal may be scraped smooth in the impressions, then models made as shown in Fig. 23. In carving the mutilated tooth cusps the operator has the normal teeth as a guide. The right lower first and second molars on the models in Fig. 23 have been carved, using the corresponding teeth on left side as a guide.

Amalgam fillings as they are usually contoured by the so-called good operator are shown in Figs. 24 and 25, which are models, lower, from the right and left side of a mouth, which afterwards was treated by Dr. Frahm with the result shown.

One of the clinics at the Colorado State Dental Association meeting in 1913 was a gold inlay by Dr. E. I. Backus, of Colorado Springs. This inlay, just as he cast it, without being polished, is shown in Fig. 26. Shortly after the synopsis of Dr. Young's paper was given in Colorado Springs last fall, Dr. Backus made the anatomical restorations shown in Fig. 27 for this same cavity.

Broken-down lower first molars and their restoration to normal form and function by anatomical inlay restorations are shown by Fig. 23. These, also, are the work of Dr. Backus.

The essayist wishes to acknowledge receipt of models of restorations to illustrate paper and clinic, from:

- Dr. R. A. Adams, Denver, Col.
- Dr. E. I. Backus, Colorado Springs, Col.
- Dr. A. B. Brusse, Denver, Col.
- Dr. M. Catlett, Denver, Col.
- Dr. W. T. Chambers, Denver, Col.
- Dr. F. W. Frahm, Denver, Col.
- Dr. J. L. Howell, Denver, Col.
- Dr. L. D. Mathews, Denver, Col.
- Dr. L. B. Morris, Denver, Col.
- Dr. C. P. Strawn, Denver, Col.
- Dr. J. H. Setzler, Fort Collins, Col.



The Dental Hygienist in Public Institutions.

By A. C. FONES, D.D.S., Bridgeport, Conn.

*Read before the Second District Dental Society of the State of New York,
January, 1914.*

It seems hardly necessary to present additional arguments to prove why the dental profession must in some practical manner solve this universal problem of decayed teeth and unsanitary mouths. For the past few years our dental literature has teemed with articles on the evil results of unhygienic mouth conditions, and of late, since scientific investigations have been made of the systemic infections from pyorrhea alveolaris and blind abscesses, the necessity of adopting some definite, practical plan to prevent at least a portion of this great evil must be plain to all. And when we say great evil, we might truly say the greatest evil, for there is nothing in our civilization that is the cause, either directly or indirectly, of so much sickness as decayed teeth and unclean mouths.

The next great advance in the elimination of **Tuberculosis.** tuberculosis will be made through the dental profession. The majority of mouths with their surfaces of congested and bleeding gums present an ideal culture medium for the tubercle bacillus. Add to this the lowered resistance of the body, induced by the lack of power to properly masticate food, and the poisons generated in these unsanitary mouths with decayed teeth and decomposed food, and we find an interesting pathological combination that seriously prevents the medical profession from making any further great reduction in the mortality from this disease.

Sociological problems, such as alcoholism, vagrancy, poverty, crime, viciousness, waywardness, will be solved chiefly by the correction or prevention of physical defects in early youth, and as the mouths of practically all children contain decayed teeth, the work of correction and prevention must start there. Most of the diseases of childhood, scarlet fever, diphtheria, mumps, measles, whooping cough, tonsilitis, etc., are preventable. With a well-planned campaign among the children in our public schools for clean mouths and sound teeth, and teaching the importance of cleanliness and of keeping practically everything out of their mouths except food, drink and the tooth brush, the sick list would shrink perceptibly. What is the use of teaching a child where the Mississippi River rises, or how many miles long it is, when we are letting his body go to pieces? Many a person has secured an education after twenty years of age, but none can secure a new body after it has been neglected and defective for twenty years.

**Influence of
Caries Upon
Health.**

Here we find the seedlings of our future civilization with their temporary teeth full of cavities, food decomposing in these cavities and around the teeth, and green stains covering the necks of the teeth.

Many of the children are able to eat only on one side of the jaw, because the teeth are so sore, or decayed, or entirely lost through decay, that but one side is available for use. In some cases both sides are wrecked as early as six years of age.

We all know what this lack of power to properly masticate food will do. Dr. Lawrence W. Baker, of Boston, has shown by experiments upon rabbits that the proper development and expansion of the cranium in early life is dependent in no small degree upon the use of the muscles of mastication. These muscles cannot exert their tension or pull on the bones of the cranium until the teeth are placed together, and if in a child's mouth the teeth are badly decayed or sore on one side, so that the chewing is done on the opposite side, the cranium is unequally developed. It can readily be seen how this will influence unequal brain development and how important it is that the temporary teeth of the child be cared for in its early life by the parents. We also know what it means to the child's digestive tract, as well as to his whole nutritive system, to have the millions upon millions of germs incubated in his unclean mouth, mixed with the food and swallowed. The most powerful poisons known to scientists to-day are those generated by bacteria. Abbott, in his book on the *Principles of Bacteriology*, states that Roux and Yersin found that the potencies of the poisons generated by the bacteria of diphtheria have been determined upon animals and that 0.4 milligrams would kill eight guinea pigs. When it is considered that 0.4 milligrams represents about $1/160$ part of a grain, we can understand what it means to the resistive forces of our bodies to have the products of the millions of bacteria in unclean mouths constantly being swept into the system.

In the brain centres, where the five senses record their impressions, there is a decided interference with the proper functioning of the brain cells, due to these pernicious mouth conditions. Not only through the nutritive system, but also from the discordant vibratory impressions playing upon these centres from sore and aching teeth, sharp edges of cavities irritating the tongue, congested and bleeding gums, alveolar abscesses and temporary teeth pushed out of position by the erupting permanent teeth.

Who does not know how disturbing it is to try and hear through the telephone when there is a slight buzzing on the wire, or how difficult it is to concentrate one's mind on a book if some one is whispering in the room? If impressions on the brain are to be properly received the body

must be sound and normal. These defective physical conditions produce abnormal thought and abnormal action. We think little of it in the child, but as the twig is bent so the tree is inclined. In adult life these abnormal thoughts and actions are gradually magnified until the young man or woman becomes a menace to society. The lack of power to properly masticate one's food means the lack of a proper stimulus from the food ingested, and in adult life there comes a craving for an artificial stimulus, the satisfaction of which is usually found in the use of alcoholic drinks. Examine the mouths of the inmates of our reformatories and prisons and see in what a deplorable condition they will be found. And the same holds good in the State sanitoriums where the tubercular patients are segregated. Much could be prophesied for the future if one-quarter the attention were given to the child's body that there is to the development of its brain, but as the time is fast approaching when this will be done, the results will prove themselves without the need of prophecies.

Nearly all our efforts in life to do good are palliative. We do not get at the source. Analyze the working of most of our charitable organizations, and we shall find that they are toward the relief of some evil already developed and that is constantly developing, but no effort is made to kill its growth at the start.

If our work is ever to prove effective in securing clean mouths and sound teeth, we must go back to the very source where the evil originated, where we find the beginning of most of our troubles, in the mouths of the children of the first grade in the public schools. It is here that we must concentrate our efforts and care for each child through the first five years of its school life.

**Bridgeport
School
Clinic.**

It was fully four years ago that our first efforts were made to interest the public officials of Bridgeport sufficiently to permit us to establish a dental clinic for the children in our public schools. All who have made a like effort know how slow and difficult it is to gain permission to enter the schools and to secure a public appropriation for work of this kind. It is unnecessary to go into detail here as to how this was finally accomplished, but at last an appropriation of \$5,000 was in sight and the prospect of a start of a preventative dental clinic was encouraging.

**The Jones
School for
Dental Hygienists.**

It now became necessary to educate a number of women in preventative dentistry, as the clinic in the schools was to be conducted by women, and an educational course for them was essential. In the early fall of 1913 an effort was made to secure a '1st



Society Papers

of lecturers who would come to Bridgeport and deliver lectures before a class of women. These lectures were to be taken down in shorthand, typewritten, sent back to the lecturers for correction and later published in a book to form an educational course for women who were to be known as Dental Hygienists. These women were to be educated to work in private offices, schools, sanitariums, hospitals, or anywhere, under the supervision of a dentist, where their services were most needed. After seven weeks of solicitations and interviews, the following generously agreed to lend their aid, without compensation, to start this work:

Raymond C. Osburn, Ph.D., Professor in Barnard College, Columbia University.

Leroy S. M. Miner, M.D., D.M.D., Assistant Professor in Surgery, Harvard Dental School.

Alexander M. Prince, M.D., Instructor in Medicine and Physiology, Medical Department of Yale University.

L. F. Rettger, Ph.D., Assistant Professor of Bacteriology, Sheffield Scientific School of Yale University.

R. H. W. Strang, M.D., D.D.S., Bridgeport, Ct., Specialist in Orthodontia.

Dr. George M. MacKee, Instructor in Dermatology, College of Physicians and Surgeons.

Dr. C. Kirk, Sc.D., D.D.S., Dean of Dental Department, University of Pennsylvania.

Eugene H. Smith, D.D.M., Dean of Dental Department of Harvard University.

M. L. Rhein, M.D., D.D.S., New York City.

R. G. Hutchinson, Jr., D.D.S., New York City, Specialist in Treatment of Pyorrhea Alveolaris.

R. Ottolengui, M.D.S., New York City, Editor of ITEMS OF INTEREST.

C. M. Turner, M.D., D.D.S., Professor of Mechanical Dentistry and Metallurgy, School of Dentistry, University of Pennsylvania.

Russell H. Chittenden, Ph.D., LL.D., Sc.D., Director of Sheffield Scientific School of Yale University.

M. I. Schamberg, M.D., D.D.S., New York City, Specialist in Oral Surgery.

H. E. S. Chayes, D.D.S., New York City.

C. Ward Crampton, M.D., Hygienist and Director of Physical Training, Public School System, New York City.

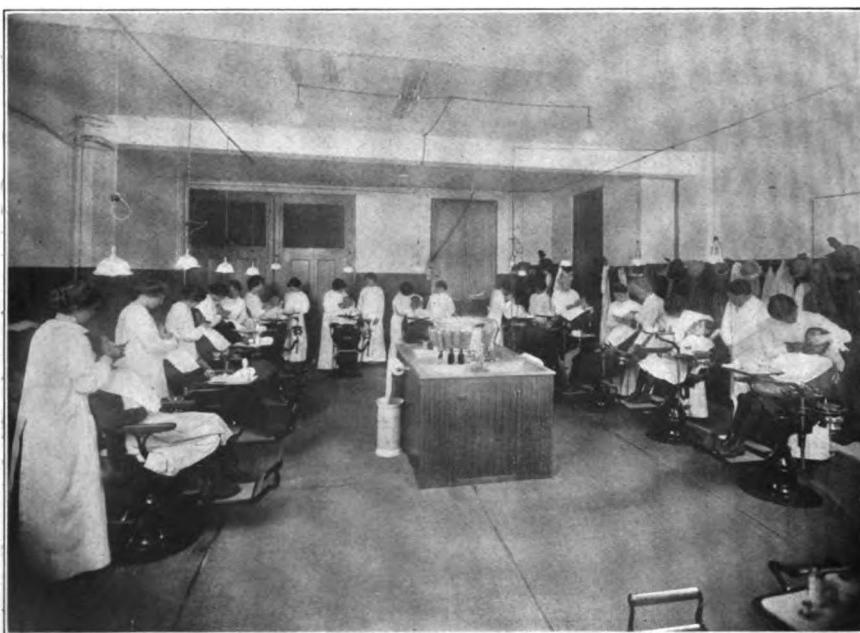
Professor Irving Fisher, of Yale University, Chairman of Committee of One Hundred on National Hygiene.

Dr. William G. Anderson, Professor and Director of Yale University Gymnasium.

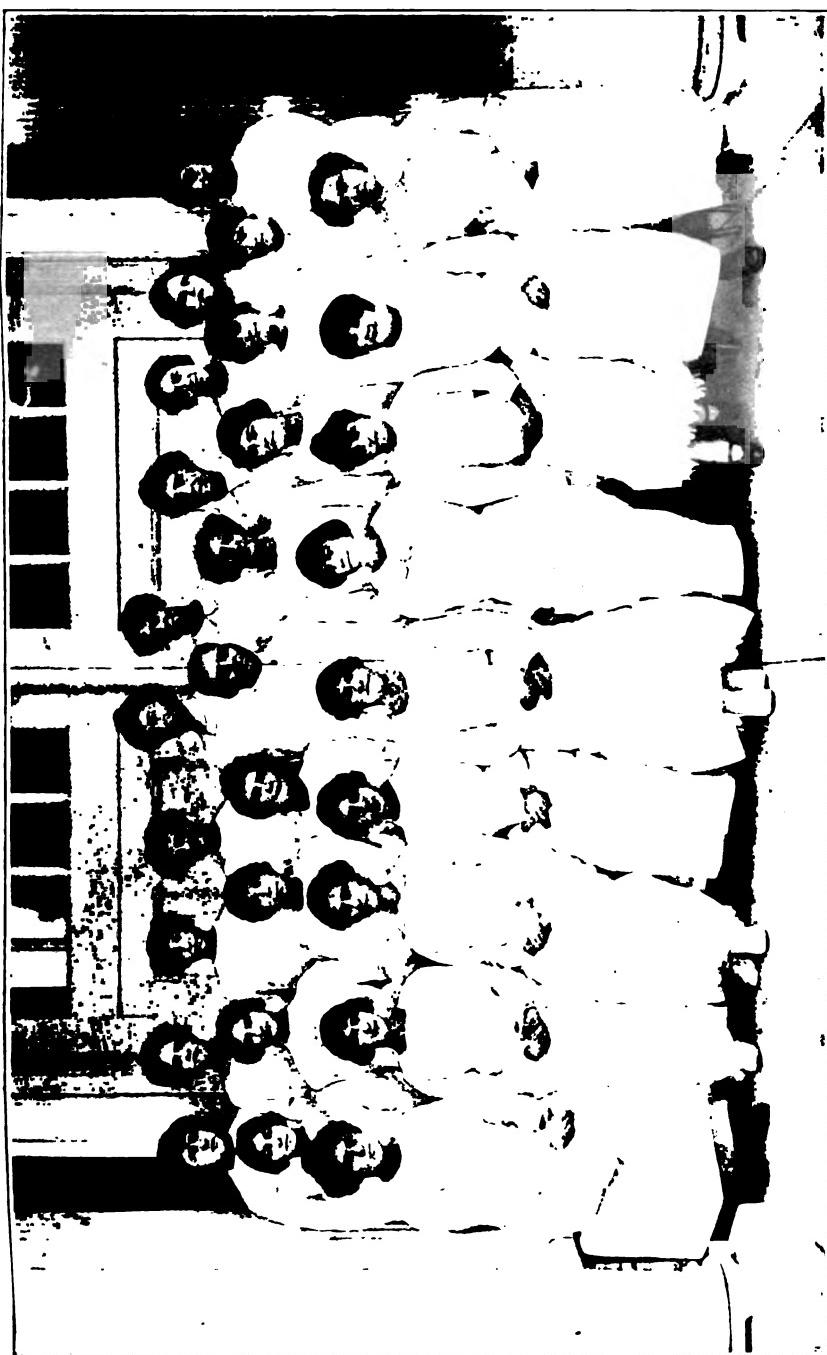
Items of Interest



The evening class working upon manikins.

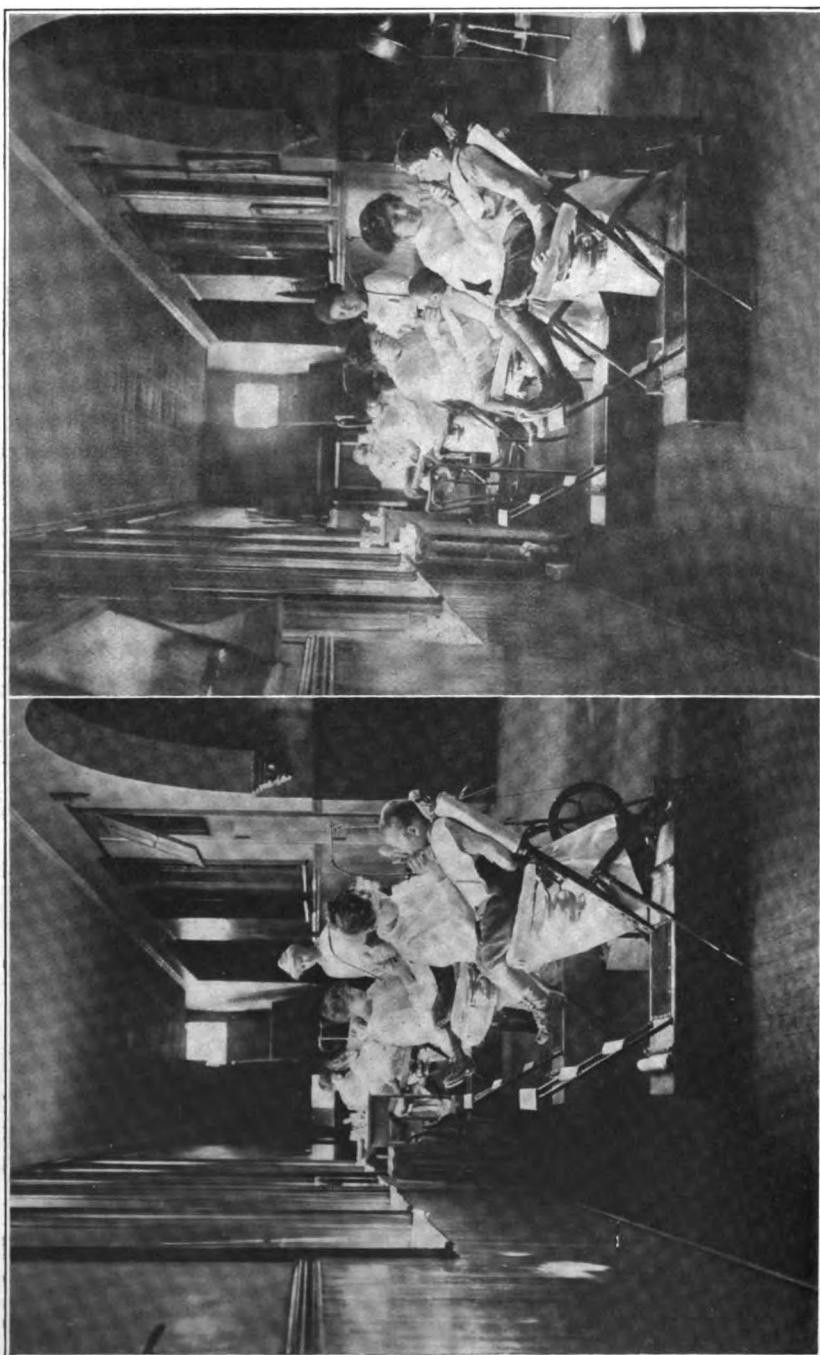


The evening class working upon children.



Graduating class, June 5, 1914.

Items of Interest



Supervisor Miss Rose E. House with her dental corps in Waltersville School, Bridgeport, Conn.

Supervisor Miss Hubert Hart with her dental corps in Waltersville School, Bridgeport, Conn.



Thaddeus P. Hyatt, D.D.S., New York City.

Miss Cordelia L. O'Neill, Principal of Marion School, Cleveland, Ohio.

Alfred C. Fones, D.D.S., Bridgeport, Ct.

Announcements were sent out to the dentists throughout the State and to medical nurses, as well as notices published in the papers. A class of thirty-two women was formed—the practical course not permitting of a larger class—and on November 17, 1913, the first lecture was given. The garage in my office was turned into a lecture room and the entire course, even to our commencement, was held in this room.

The lectures were held in the evenings on Mondays, Wednesdays and Fridays, and aside from a vacation period at Christmas time were held weekly from November 17th until March 30th. The class assembled at 7:30 and a quiz master reviewed one of the previous lectures for a half hour. At eight o'clock the lecturer of the evening stepped upon the platform and lectured until 9:30. Examinations were held upon the various subjects and at the end of the lecture course it was found that all but six had passed above 70 per cent.

On April 8th the practical course was started, the room now being converted into an operating room. The S. S. White Dental Mfg. Co. very kindly loaned us sixteen new Diamond chairs, and with an improvised sink and drop lights and sixteen manikins, the class was ready for practical instruction. It was divided into two sections, one for afternoon and the other for evening instruction. Time and space will not permit of my giving the methods of instruction and training employed, but the full details will be found in the book, "Mouth Hygiene, A Course of Instruction for Dental Hygienists," now being prepared for publication by Lea & Febiger, of Philadelphia.

After the class showed a proficiency in handling their polishers and instruments on the manikins, work was begun on the children. Over five hundred children were given prophylactic treatments and instruction in brushing. We were obliged to turn many away, as the number applying for treatment far exceeded our capacity for handling them. Following the work on the children, over two hundred adults were given treatments and instruction.

Examinations were held during the progress of the work, and at the end of seven weeks the practical course was finished. Subsequent observations and testimonials have proved that the fundamentals of practical prophylaxis were obtained during this course.

On the evening of the 5th of June, 1914, a banquet and commencement was held in the same room. Dr. Edward S. Gaylord, of New Haven, Conn., acted as Master of Ceremonies, calling upon a number of

the lecturers who were present and some of the members of the class for speeches. Prizes generously donated by Drs. Ottolengui, Strang and Prince were awarded. At the end of the exercises a certificate was given to each graduate as an indorsement of her faithful work and study and the belief in her ability to practice as a dental hygienist.

**Training of
Hygienists for
School Clinic.**

We now had help for our public school work, and two women from the class were selected to act as supervisors. In July, 1914, another class was chosen, chiefly high school graduates, and through the summer lectures and practical training were given in this second class by Drs. R. H. W. Strang, T. A. Ganung, W. J. McLaughlin, and the supervisors, Mrs. Winnifred A. Hart and Miss Rose E. House. In September, when school opened, this corps of eight operators and two supervisors was ready to start work in the school buildings on the children of the first grade.

The Problem.

Before explaining our method of handling this preventive clinic, let us consider the proposition as a whole in order to better judge whether we are attacking this problem from a logical viewpoint or not. In almost all of our cities the children throughout the public schools will average about six cavities per child. In the city of Bridgeport, with its twenty thousand school children, we may closely estimate the number of cavities as 160,000. Even were wholesale extraction permitted, it would take a corps of twenty-five dentists two years to properly restore these mouths to a sound and healthful condition. Such an expensive charity is at the present time out of the question, for several reasons. First, our city officials do not as yet appreciate sufficiently the immense importance of the teeth to good health to be willing to appropriate such a sum. Second, unless it were followed by a definite system of prophylaxis in the schools, such work would be palliative only, and in a few years an equal number of cavities would again have accumulated. Third, until a greater interest in the care of their mouths is awakened among the children and their parents, the making of such operative work compulsory would cause much trouble. Fourth, it is a hopeless and endless task, for it does not stop the flood at the source, but merely repairs the damages after they occur. Let us then accept these facts as we find them, and admit that the task of filling all of the decayed teeth for the children is impossible.

**The Possible
Solution.**

But can we not confine our efforts to the children of the first grade, where the permanent teeth are just erupting, and by giving these mouths a thorough prophylactic treatment four or five times during the school year, and educating the children by tooth-brush drills

and talks as to how to keep their teeth free from food, prevent the permanent teeth from decaying and save them the necessity of dental operations?

As they advance to the second grade a corps of dental hygienists will take care of them in their second year of school life. Again in the third year, and so on up to and including the fifth grade. A few additional women will be added to the numbers when needed, so that a child will have its teeth kept clean and polished during the first five years of its school life. If such a system is adopted we will have from the year it is started an army of children with clean mouths in the first grade advancing the next year to the next grade. Again this clean mouthed army will advance into the third grade and so on up to the fifth, pushing before them those who have innumerable decayed teeth. In five years' time practically all the children in the first five grades will have clean mouths and sound teeth. And if this education and training had meant all that it should, in eight years we would have all the children in all grades with healthy mouths, and the new-comers entering into a definitely formed system.

**Work Accomplished
by Eight
Dental Hygienists.**

Now possibly some of this sounds theoretical, but let us look at some facts and figures that may prove we are trying to be exceedingly practical. In the first round through our public schools the corps of eight dental hygienists cleaned and polished all of the teeth of the children in the first grade, and by working after school hours and on Saturday mornings for many of the children in the second grade. The following table will give an idea of the general conditions found in the mouths of the children of the first grade and a part of the second grade:

First Round.

TOTAL WORK FROM SEPTEMBER 8TH TO DECEMBER 12TH.

	Grade 1	Grade 2	Total
Pupils Given Prophylactic Treatments..	3,826	840	4,666
Cavities in Temporary Teeth.....	21,432	4,092	25,524
Cavities in Permanent Teeth.....	1,575	742	2,317
Children with Malocclusion.....	2,697	768	3,465
Children Without Tooth Brushes.....	3,249	566	3,815
Fistulas Showing Abscesses.....	508	90	598

The relatively large number of cavities in the temporary teeth as against the small number in the permanent teeth will be noted. Also note the increasing numbers in the permanent teeth of the children of the second grade.

Here is a proposition within reason. If we can have a repair clinic to fill these permanent teeth of the first grade pupils and for any extractions of temporary teeth that are abscessed or need removing we can, in a comparatively short time, have a reasonably clean environment for the new permanent teeth that are erupting from six to twelve years of age. What new cavities would form in the permanent teeth in the next five years under this prophylactic care would be comparatively few in numbers, and could be easily taken care of by a small repair clinic. We would also provide for the relief of any child suffering from tooth-ache and unable to pay for dental service.

On the 8th of September the work was started in our public schools, twenty-eight in number, and throughout them all we have been cordially received by the principals and teachers. The children have taken very kindly to the treatments and it has been our regret that we could not aid those in the higher grades who wished to have this service.

The hygienists work in pairs, as a rule, two remaining in the school until all of the children of the first grade are given treatments and some in the second grade also. It is our intention to give the second grade children one good cleaning during the year in order to have a fairly clean zone ahead of our first grade children.

The supervisors give tooth-brush drills, oversee the work, look after supplies and give class-room talks to the first and second grades. Each operator is supplied with an S. S. White portable chair, a cabinet, stool and dental engine, besides all of the necessaries for sterilization in their work. Their chairs are placed anywhere in the school where they are out of the way, have plenty of light and have running water. On stair landings, where they are deep enough to give ample room for marching lines; in the basement, if it is warm and dry and sufficiently light; in cloak rooms or in hallways, we can always find a place to put the chairs.

Up to the present time, Dr. R. H. W. Strang
Educational Lectures. and myself have given stereopticon lectures, using the acetyline gas lanterns, to over five thousand children in the third, fourth, fifth and sixth grades.

About fifty-five slides are used in this first series of lectures, the last part being a demonstration in brushing the teeth and a distribution of pamphlets containing fourteen pictures illustrating the home care of the mouth. We have designed a portable outfit that can be readily transported to and from the schools and can be easily put in place in a short time.

As this educational work proceeds we will teach the children how to masticate their food, and, in teaching the proper use of the teeth, teach them the proper foods for their bodies. We believe that under such a



form of education the children entering the first grade will in a few years show a much improved condition of the temporary teeth. The lessons taught to the older children in school are taken home and should result in the parents giving more attention to mouth hygiene among the little children yet too young to enter school. A system of record charts is being kept showing the condition of each child's mouth. Examination blanks are sent home to the parents, with printed slips stating what we are trying to accomplish and asking for their co-operation. Tooth brushes are sold to the children at cost and it has been difficult to supply the demand.

Starting in on our second round of prophylactic treatments we were much encouraged to find in the first school that out of one hundred and sixty first grade children requested to bring their tooth brushes to school for another drill there were only six who failed to have them to bring.

In closing, I wish to say that this work in the school is chiefly woman's work. The children climb up into the dental chairs with but little fear, as they have confidence that the women will not hurt them. I doubt if this same trustfulness would prevail if standing beside the chairs were eight men instead of eight women. There will never come a time in our civilization when there will be no decayed teeth, but there will come a time, and it is not far distant, when the majority, instead of the very small minority, will have mouths free from dental decay.

The New Gospel of Health According to the Dentist.

By DR. HAROLD CLARK, Toronto, Canada.

Read before the New Jersey Dental Society, Asbury Park, July, 1914.

When choosing dentistry as a profession I had many misgivings, fearing that I should encounter regrets when I had gone so far that the gate would be closed behind me. Fortunately, I had not practiced dentistry long before I knew my fears were unfounded. I soon discovered that I was engaged in a profession that was full of real achievement and opportunity for new achievement. How seldom does the dentist labor for his patient when he has not the consciousness that he has rendered him a positive service! The zest this gives to our work is a very real part of our recompense. By contrast, what a depressing task it must be for the physician to tell all that can be told when consulted by the victim of cancer, Bright's disease, epilepsy, or any of a multitude of maladies for which the achievement of centuries has been very little.

Up to about the year 1800, extraction was about the only cure for toothache. Now, instead of allowing the carious process to take its

course until the intolerable agony of it leads to the removal of the tooth, we can check the process, repair the lost tissue and restore the organ to its normal use. A look back on the development of the art and practice of dentistry reveals a most interesting and gratifying achievement. The brains, ingenuity and patient industry represented in amalgam, gold, porcelain, cast metal, silicate, and other fillings, and their value to mankind, are hard to realize even by the dentist himself. And then, when fillings fail, we have the various forms of crowns and bridgework. Where their application is consistent with good engineering principles, and sanitary requirements, what a boon they are to the wearer! Then there is the modern denture, whether of metal or vulcanite. What a blessing to the edentulous unfortunate! Many of us here have seen the full upper and lower dentures worn by George Washington, hewn out of solid ivory, and of great price. Compare the misery that must have been endured in their use with the comfort that can now be given with common vulcanite dentures, when these are made as well as they can be. The orthodontist, with his models and photographs setting forth the "before and after" of his work, almost figures in the rôle of a wizard, rearranging the irregular teeth, improving their efficiency for mastication, minimizing their susceptibility to caries, and giving them their maximum esthetic value.

These by no means represent the whole gamut of dental achievement; and yet, when we look at it all critically, our pride must surely take a fall. Is not our labor for humanity very like an elaborate system of "swatting flies" instead of removing their breeding places?

If all mankind, civilized and savage, present, past, and prehistoric, were all similarly afflicted with dental caries, the situation would indeed seem hopeless. We might be excused in taking it all for granted, and going on much as we are doing. The savage, however, who is untainted by the influence of civilization, has teeth that are as near immunity as civilized man's are far from it. If all civilized mankind were generally susceptible, we might still despair of doing anything more than improve our present methods. Or if immunity, on the one hand, were always associated with the highest degree of good health, and, on the other hand, susceptibility only found in those of low vitality and poor health, we might naturally assume that they were simply attributes or expressions of good or of bad health. But we all know that dental caries seems to obey no rule. We see one individual with generally good health, and yet with rampant caries; while another, with poor health, will be practically immune. Another person may seem to pass through periods of immunity and susceptibility. One individual may have a filthy, uncared-for mouth, and yet his teeth be immune; another, giving his teeth every

care, is constantly in the dentist's hands. We often see members of the same family show the extremes of susceptibility and immunity where we should expect similar heredity and similar environment to give similar conditions.

**Phenomena
of Dental Caries.**

It is this very seeming paradox that seizes the imagination and suggests that there must be some elusive factor or factors in the phenomena of dental caries which, when discovered and understood, will explain the anomalous character of all these facts.

Already scientific investigation of this problem has made positive progress. We are all more or less familiar with the work of Tomes, Magitot, Milles and Underwood, Miller, Black, and others. Tomes laid the foundation of the knowledge of dental histology and tooth development. Magitot's conclusions made caries the result of the action of chemical substances developed in the mouth or introduced with the food. Milles and Underwood determined that the tubules in dental caries contained micro-organisms. Miller differentiated the various micro-organisms found in carious dentine and separated out those which, in the presence of starch and sugar, produce lactic acid. Also he showed that lactic acid dissolves out the lime salts of tooth tissue, and he was able, artificially, to produce dental caries outside of the mouth that was identical with the natural process within the mouth. His findings were approved and accepted by the scientific world, and even to-day he is credited with the discovery of the cause of dental caries. The acceptance of his enunciation of the septic origin of dental caries, and the dependence of this process upon carbohydrate débris in the mouth, led the dental profession into a campaign as wide as civilization of oral antisepsis and prophylaxis, in the hope of coping with dental caries. While the results of this propaganda may have made it well worth while, it has been disappointing, for there still remains with us the large unsolved problem of susceptibility. Black's investigations proved that immunity and susceptibility had no explanation in the hardness or softness of teeth. For a considerable time after Miller's theory had been accepted, the progress toward a further clearing of the mysteries of dental caries seemed to mark time. However, during the past ten or twelve years several valuable contributions have been made to the subject by various investigators. I shall refer to but two or three of them, as they will indicate what has been done recently, and the direction in which research is being made.

**Influences of
Diet and Force of
Mastication.**

J. Sim Wallace has written several valuable works. Among them are: "*Prevention of Dental Caries*," "*Modern Dietetics and the Causation of Disease*," "*Physiology of Mastication*," and others. The dominant note in all his books is the paramount

importance of a diet requiring heavy mastication. He draws attention to the fact that although our civilization has lasted many generations, the countless generations that preceded it make its period seem almost negligible. He speaks of this earlier period as the "precibicultural" era, that is, the ages that preceded the cultivation of food, when man lived on such food as was ready to hand, much as did the animals about him. This era, in his evolution, probably fixed the relation between his alimentary organs and the character of the food they had to take care of. The effort of civilization to improve the order of the past seems to have resulted in disorder. This disorder, Wallace claims, commences in the diet of infancy. It is unnecessary to go back to prehistoric evidences to study primitive man. We find ample opportunities to learn of him in the aboriginal races we find to-day that are still unaffected by civilized conditions. An interesting and significant observation in the study of these people is that most of them have neither cows nor goats to give them milk, and when an infant is weaned it has to use its teeth and masticate its food, while the civilized mother feeds her child cow's milk or milk-soaked food for years after weaning it, although it has an upper and nether millstone spoiling for something to do. Wallace sees grave consequences in this first departure from the order of things established in the precibultural ages. The heavy mastication necessary for the aboriginal child develops the jaws and the size of the tongue, and, consequently, ample room awaits the permanent teeth as they come, and there can be little doubt that this does away with difficult or pathological dentition. Wallace is convinced that in the rough food, with the fibre and cellulose that accompany it, lies the explanation of the excellent teeth of the savage. As a test experiment, he succeeded in having fourteen children dieted from birth according to his convictions. At ages ranging from five to seven years their teeth were examined, and not one tooth of any one of these children showed the slightest sign of caries. He states further that a similar number of children from the same class with their ordinary diet would have shown not less than eighty or ninety carious teeth at the same age. Wallace makes the modern refinement of food responsible, not only for dental caries, but for the prevalence of dyspepsia, constipation, nasal obstruction and much of the physical degeneracy that follows.

**Influences of
Saliva Upon
Caries.**

The same subject, "*The Prevention of Dental Caries and Oral Sepsis*," is treated in a work by H. P. Pickerill. If there is anyone here who has not read this book, let me commend it to him, especially the chapter on "*Saliva*." While he, also, attaches much importance to food that requires heavy mastication, he finds the

main cause of dental caries in the physical and chemical condition of the saliva, as influenced by the selection and balance of the articles of diet. His book is full of the results of all kinds of laboratory investigation, made with the object of ascertaining the relation between various kinds and combinations of food and an acid mouth favorable to caries, or, on the other hand, an alkaline mouth in which caries is inhibited. These results are all laid out in tabular form, or indicated by curves. In his chapter on the "*Incidence of Caries*," the tables are most instructive. Among civilized people, where records could be made, the maximum proportion having carious teeth reaches as high as 98 per cent. and over, while in savage races it falls as low as one per cent. In this connection, Pickerill makes one very interesting and important observation. The Maoris, untouched by civilization, are among the very most immune of all races, and yet in examining fifty Maori school children, living under European conditions entirely, he found that 95 per cent. had carious teeth. This fact gives very poor support to the theory that heredity has much to do with immunity or susceptibility to caries.

His chapter on "*Saliva*" abounds in tables giving the results of many ingenious and interesting experiments; tables showing the effect of all kinds of food upon the amount and alkalinity of the saliva during and after eating; the effect on the saliva of various liquids taken with the food; the influence of acid elements in the food; tables showing salivary depressants; results of experiments on the saliva of lower animals; studies on the action and value of ptyalin. Pickerill's conclusions, after setting forth a mass of information, are: That normal saliva, in normal quantity, is a perfect protection for the teeth; that natural organic acids are the stimulants that excite the secretion of the greatest amount of those protective substances, and cause an alkaline flow of saliva for a long time after stimulation. His final statement is very positive. I shall quote it. He says: "That in the saliva is provided a natural and potentially perfect mouth wash, acting continuously day and night; that it is, moreover, completely under control; that it may be altered or varied in amount or composition; that its beneficial effects may be increased or decreased absolutely at will." In another chapter, the results of a series of experiments give the relative fermentability of the various carbohydrate food-stuffs. Further tables set forth the effect of combining fruit or vegetable acids with carbohydrate food. I shall again quote his conclusions drawn from these experiments. He says:

"Starches and sugars should on no account ever be eaten alone, but in all cases should either be combined with a substance having a distinctly acid taste, or be followed by such substances as have been shown to have an 'alkaline potential,' and the best of these, undoubtedly, are the



natural organic acids found in fruits and vegetables."

Other interesting and valuable chapters follow: "*Dietaries of Immune Races*," "*Dietaries of Modern Civilization*," "*Ideal Dietaries*," "*Educational Measures*," "*The Need for Special Legislation*"; but time and the scope of this paper forbid even a reference to their contents.

This brief review of recent work done on the

Kirk's Views. problem of susceptibility to caries would be quite incomplete without a reference to the contributions of Dr. E. C. Kirk. He has for years contended that in addition to the fermentable carbohydrate débris left in the mouth from food, a dissolved carbohydrate, the product of metabolism, finds its way through the circulation into the mouth, and is an important factor in the causation of susceptibility. In an epoch-making paper, read to the Toronto Dental Society last November, Dr. Kirk reiterated his conviction that in addition to the débris which he calls alimentary carbohydrate there is also what he designates as "metabolic" carbohydrate, this dissolved carbohydrate derived from the circulation, and probably due to the overingestion of carbohydrate food. This element is a fertile culture-medium for the lactic-acid-producing micro-organisms. Mouths that are rampant with caries abound with this metabolic carbohydrate, while mouths that are immune have little or none of it. In this paper, Dr. Kirk advanced another theory, which, if well sustained by further investigation, may solve many of the riddles that beset the problem of susceptibility. He drew attention to the well-established fact that an injury to the *hypophysis cerebri* results in a large increase in the carbohydrate content of the blood. Because of the close regional relationship of the *hypophysis cerebri* to the deep origin of the trigeminus, he believes it probable that pathological dentition results in a disturbance of this pituitary body, and may be a factor in the high susceptibility of many individuals. It gives rise to the thought that if Wallace's diet for weaned babies and teething children were carried out, there might not be pathological dentition, and that the enlarged pituitary body, with the accompanying abnormal carbohydrate content of the blood, and its influence on susceptibility, may be traceable to an unnatural and vicious method of feeding infants and children.

I shall not further review recent investigations of the subject of susceptibility and the cause of its prevalence among civilized peoples. There are many other contributions of interest and value, but I have outlined enough for the purposes of my paper.

The bulk of the problem, of course, has yet to be worked out by the investigations of the man of science, but recent research has given us many new conclusions, some possibly correct, others probably correct,



and still others as well established as the limitations of laboratory methods will allow. Surely, an important part of the work lies at the door of the practising dentist. It is he who can try out and check up the conclusions of the laboratory man. If each one of us could experiment on even a few actual cases, and report results to some central bureau, a mass of practical information would accumulate from which many positive and valuable deductions might be made, and many a theory would either become a law or be set aside as untenable. It seems to me that the opportunity for the dentist to do a great service to humanity is very large. In his endeavor to lay his finger on the real cause of caries susceptibility, it seems more than probable that he is also discovering the real cause of many of the ailments and diseases that beset the lives of civilized humanity and make for physical degeneracy.

If this metabolic carbohydrate that is found in the mouth, in the blood stream, in the very tubules of the dentine of carious teeth, is responsible for the rapid proliferation of many varieties of germs found in the mouth, what reason have we for thinking that its influence is confined to the mouth? Is it not probable that while this fertile pabulum is being poured into the mouth it is also being poured into the whole alimentary tract? May it not be responsible for the high bacterial content of the intestines, which Metchnikoff would combat with a buttermilk diet? May it not account for the high degree of infection so frequent in the appendix, and thereby explain the prevalence of appendicitis? And may it not also explain the susceptibility of one individual to typhoid invasion and the immunity of another who is similarly exposed?

**The Author's
Views on
Caries.**

Personally, I have done but a fraction of what I might and ought to do along these lines. From the beginning of my experience as a dentist I have been much interested in the enigma of immunity and susceptibility. But although I have possessed neither the time nor the training which would enable me to do any scientific research on the problem, yet, like any practicing dentist, I have had much opportunity for making observations and drawing some conclusions. I have for years inquired into the diet of patients exhibiting the extremes of immunity and susceptibility, and I long ago observed how generally susceptibility went with the excessive ingestion of sugar and sweetened foods. Miller's theory calls for the fermentation of the débris of carbohydrate food about the teeth. Now, the solubility of sugar, its constant dilution in the mouth with saliva, and the rapidity with which it must be swallowed, convinced me that its baneful action on the teeth must be some reaction after deglutition; but I could get no further until Pickerill, Kirk, and others, bridged the gap for me. I learned that over-

ingestion of carbohydrates results in a soluble carbohydrate returning to the mouth by way of the circulation. I learned that this substance is a most fertile culture-medium for micro-organic life. On reading some of Pickerill's tables, I found that my convictions regarding the culpability of sugar in the causation of caries were put to considerable strain, for he shows that cane-sugar is far below chocolate, cake, pastry, and even toast, in the production of lactic acid. I strongly suspect, however, that the mischief done by sugar is as much indirect as direct, but none the less positive. Sugar is so attractive to the average human palate that it, or any food made rich with it, is eaten far beyond the normal promptings of hunger, and thereby the alimentary system is oversupplied with carbohydrate foods of various kinds. Sugar confronts us in so many ways. In candies and chocolate preparations. We dissolve it in our drinks, tea, coffee, cocoa, lemonade, etc. We spread it on our cereals, puddings, pastry, and fruit. We cook it into our cakes, pies, puddings, etc., also in jams, jellies, and marmalade. We find it in syrups and honey. It is indeed difficult at the ordinary table to avoid sugar and sweetened food, even when one wishes to, and, as I said before, it leads to the overconsumption of carbohydrate food. A homely example will point my argument. A hungry individual will eat heartily of meat and vegetables until he can be prevailed upon to take no more, and then he will eat a helping of some sweetened pudding, and perhaps a second helping. If, instead of the sweetened pudding, he had been offered plain boiled rice, he would have eaten none of it, proving that the joke about the little boy's definition of a dessert was no joke at all. He said, you will remember, that "a dessert is what you eat after you have had enough."

My inquiries as to the diet of immunes and highly susceptibles has made very strong my conviction that caries of the teeth is largely a matter of diet. Frequently I have for a time thought I had found cases that contradicted or were exceptions to my usual experience, but further inquiry revealed that some point had been overlooked. An example or two will illustrate.

I have a patient who is immaculate in the care of his teeth and rigid in his diet according to his lights. For years he exhibited less than usual susceptibility. Recently he presented and I found a surprising number of cavities. Upon inquiry there seemed no reason from his diet for the increased susceptibility; but further questions revealed the fact that for some time he had been trying to increase his weight, and to that end he was drinking each night a quart of milk, a large part of which he took in the form of hot cocoa. In view of the fact, set forth in one of Pickerill's tables, that chocolate is more than twenty times as fermentable as cane sugar, it was easy to suspect that his cocoa was

responsible for his remarkable increased susceptibility to dental caries.

Another case was a man of about 48 years. After unusual immunity for years he suddenly exhibited several carious teeth. I probed for sugar in his diet. He confidently told me I should have "to guess again," as he was not fond of sugar and left the candies to the ladies. I made a detailed inquiry, running over a list of possible sources, naming jams, jellies, marmalade, honey, syrup, etc. At the mention of honey, his wife, who was standing by, exclaimed, "Why, George just lives on honey!" It transpired that some two years previously he had discovered something special in the honey line, and was assured that it was most wholesome as a food.

In some cases I have had the patient for one week keep a detailed record of everything eaten or drunk, and some amazing menus have been revealed by this method which never would have come out through the ordinary inquiry. I have to thank Dr. Kirk for suggesting this way of getting at facts.

I shall refrain from a further recital of cases, as they are usually very tedious, but I might tell of several children with marked susceptibility, where I was able to gain the co-operation of both child and parent in the observation of a more correct diet. After the first year these cases have been practically immune, and, with it all, a noticeable improvement in general health.

I have found some difficulty in the matter of instructing patients about a diet. One may tell them to choose the rougher, more fibrous foods, that will demand mastication; to cut down their consumption of sugar and sweetened foods; to eat succulent vegetables and fruits, etc. But these are generalities, and many patients do not seem to be able to follow them intelligently. It has taught me the need of having a more specific or detailed diet to recommend. To this end, would it not be possible and practical to have a few committees in various centres, composed of, say, a dentist posted on the essentials of diet for the well-being of the teeth and mouth; a physician, with special fitness as an alimentary specialist, and the head of a domestic science school, and have these committees work out a week's menu, physiologically correct, and at the same time presenting an agreeable and appetizing variety. Along with this physiological bill of fare might be appended, or paralleled, a list of those foods or combinations that should be avoided. I am well aware that a menu suitable for one would not be best for all. Age, occupation, climate, and other things, would call for modifications of a general diet. But the vital principles that are essential for one would probably be the same for all, except perhaps in some pathological cases.

We are all familiar with the work done by the dentists in the public



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schools of Cleveland and other centres, to arouse public interest in the national importance of having the rising generation grow up without the handicap that goes with decaying teeth and foul mouths. It has been abundantly proved that much of the physical degeneracy about us, and with it mental and moral degeneracy, are traceable to dental caries and septic mouths. If the dentist did no more for the public weal than the carrying out of this work, the results should entitle him to a place among the noble professions; but I am convinced that a far greater opportunity for service is knocking at his door. I am satisfied that our scientific investigators are establishing a positive relationship between a faulty selection and balance of diet and dental caries. I am hopeful that, with the organized co-operation of the practicing dentist, it will soon be possible to put practical immunity to caries within the reach of all; and in wiping out the cause of dental caries there is little doubt that with it will disappear many of the maladies that afflict civilized humanity and make for degeneracy.

Sir William Osler said recently that the next great thing in the matter of public health is coming from the dentist. Is the professional spirit of the dentist and his interest in the welfare of mankind large enough to find him enlisted in the work that will fulfill the prophesy of this great physician?





Dental Hygienists at Work in the Public Schools of Bridgeport.

In the editorial in the January issue, in an endeavor to estimate the amount of dental work which could confront the Forsyth Dental Infirmary, we started with the premise that there are 122,000 school children, eighty per cent. of whom show dental defects, making a total of 97,600. We have discovered that our figures were erroneous. The editor of the *Dental Cosmos*, in his January issue, dealing with the same subject, tells us that there are 118,000 children in the public schools of Boston, so that of course there can not be 122,000 defective children. In his address at the dedicatory exercises, Mr. Edward T. McSweeny stated that there are 128,000 children in the Boston schools, and then alluded to "122,459 defects noted." The writer evidently misapprehended this statement and supposed that Mr. McSweeny meant that there are that number of defective children, whereas he evidently meant merely that number of separate defects. A communication was sent to Dr. Wm. J. Gallivan, Chief of Bureau of Child Hygiene, Boston, asking for correct statistics, and his reply reads as follows: "Total attendance public school, one hundred and ten thousand; attendance first grade, fifteen thousand."

These figures appear to be lower than those given by Mr. McSweeny or by Dr. Kirk, and without further consideration would seem to render our final estimate of work needed (1,000 cavities per day) as greatly

exaggerated; yet in the light of other information received since the editorial was written, the guess appears not to have been far wrong.

We argued that eighty per cent. of the 122,000 children (Mr. McSweeny's figures), or 97,600, would have four cavities each (as estimated by Dr. Ward Crampton), a total of 390,400 cavities.

Estimates as to how many cavities might be found in a school, in the past has been largely arrived at upon a basis of averages, dependent upon the examination of the mouths of a few hundred children. In this issue appears a paper by Dr. A. C. Fones, this being the first report of the work of Dental Hygienists in Public Schools, and by examining and actually counting the cavities in the mouths of 4,666 children, he finds *an average of six cavities per child, not of eighty per cent. of them, but of all of them.* Therefore, if the same ratio would hold good in Boston, the 110,000 children there (Dr. Gallivan's figures) would have 660,000 cavities instead of the 390,000 which was the basis of our January argument. The writer, however, does not claim, nor does he think that this percentage would hold for the entire school population, but he does believe that if an actual count could be made, the January figures would not be very far wrong. However, we have another and a serious side of this question to discuss, and it is of especial interest, because it has not been discussed heretofore.

**The Proposed
Solution of
the School Problem.**

The solution of the school problem as outlined last month was that trained dental nurses, or dental hygienists if the term is preferred, should take charge of the children in the first grade, and follow these same children into the second, third, fourth and fifth grades, a new supply of nurses each year taking first grade children. By this means it was suggested that caries of the permanent teeth would be detected early, and being in the incipient stage always, the Forsyth Dental Infirmary might be able to treat and fill them as fast as found. The writer overlooked what now seems to be a problem of the first magnitude, viz: *caries already existing when the child enters school.*

Dr. Fones advocates practically the same plan (indeed, the writer very probably borrowed the idea from Dr. Fones), but he reports the new fact of importance which the practical application of his plan has so promptly brought to light.



The city of Bridgeport having entrusted to Dr. Fones the testing of his preventive or prophylactic clinic, he and his assistants trained ten women to be dental hygienists and put these women to work in the public schools. In children of the first grade they treated 3,826 children and discovered 21,432 cavities in the temporary teeth, and 1,575 cavities in permanent teeth. They also treated 840 children in the second grade, finding 4,092 cavities in temporary teeth and 742 cavities in permanent teeth, a total of 25,524 cavities in temporary, and 2,317 in permanent teeth.

A curative clinic might be inaugurated to care for the cavities in the permanent teeth, if Bridgeport had a Forsyth, but the 25,524 cavities existing in the temporary teeth before the hygienist could give even one prophylactic treatment, confronts us with a problem which must be met. We are in debt to Dr. Fones and his co-workers, however, for showing us this problem, because we could not find a solution while in ignorance of the facts.

It is still the belief of Dr. Fones, of the writer and of others, that the prophylactic clinic in the hands of properly trained women, working in conjunction with an adequate curative clinic, can practically eradicate caries from the permanent teeth. But this tremendous extent of caries in temporary teeth, of course, cannot be controlled by dental nurses, nor by nurses and dentists jointly, if nothing is done before the child enters the first grade. The task is too tremendous.

It must be remembered that Dr. Baker, of Boston, has proved with young rabbits that the non-use of the teeth during the infancy of the animal retarded the development of the jaws and even of the brain cavity itself. Dr. Baker's experiments were repeated by a German investigator with like results. It is manifest, therefore, that caries of the temporary teeth, by interfering with proper mastication and by hindering proper use of the jaws, must be a factor in the lack of development of children so suffering. Add to this the infectious material poured into the system from abscesses upon these temporary teeth, and we have another element of retardation through corruption.

The time must come then when this temporary tooth problem must be met. If the dental nurses in the Bridgeport experiment prove their efficiency and fulfill but half of Dr. Fones's prophesy, they will quickly

be recognized as a public necessity in all progressive municipalities. Then very probably it will be found expedient to introduce the nurse into the kindergartens.

There are two other possibilities. What is done in school is reported at home. If we can but arouse communities to the point of providing dental nurses for the compulsory cleansing of the teeth of school children, the parents mayhap will be sufficiently interested to provide them with tooth brushes prior to their entrance into school in the first grade classes.

The other hope is that the child taught mouth hygiene in school will go back to the home and teach it to his little brothers and sisters, yea, even unto the mothers and fathers.

Already Dr. Fones tells us of two significant occurrences. One youngster was caught stealing a box of tooth brushes that he might supply his home folks. Some progress has been made when a child will count a tooth brush as worth stealing. In another instance a lad of eight was seen surrounded by nine or ten grown men. Investigation disclosed that he had received his first lesson in tooth-brushing, and brush in hand was spreading the gospel of the clean mouth among his elders, and giving a practical demonstration of the Fones mouth cleansing methods. Verily a prophylactic missionary, aged eight!

All who are interested in the mouth hygiene movement should watch the results of the Bridgeport experiment, for by it we shall undoubtedly learn the true method of curbing the evil of dental caries and the worse evil of mouth and systemic infection which follows in its wake.

While on the subject of the dental nurse, or **The Trained Dental Nurse.** dental hygienist, a word may be said to those that oppose the movement. The advocates of the nurse have been grossly misunderstood in two important respects. First, by a trained dental hygienist we do not mean office girls trained by private practitioners. We would not ask any State Legislature to legalize such workers, any more than we would expect licenses to be granted to dentists taught by other dentists, though in times past that was the only method of entrance into dentistry. So likewise in the past the greater number of non-graduate women practicing prophylactic cleanings have been trained by individuals. But the hygienist

of the future, the woman to whose tender and skilled care we stand ready to intrust the great work of saving our children, must, of course, be a graduate of a proper training school.

Again we are in debt to Dr. Fones, not alone for carrying through the first course of this kind, but for producing along with this band of graduates a text book for the training of others, which work is even now in press.

**A Possible
Work for the
Forsyth Infirmary.**

Let us for just a moment apply the figures given to us by Dr. Fones to the Boston situation, to get some adequate idea of just what the task is in the first grade alone. Dr. Gallivan tells us there are 15,000 first grade children in Boston. In Bridgeport there are 3,800. Let us say that the Boston first grade contains approximately four times as many children as Bridgeport. Then, if the ratio of defects should prove to be the same, in Boston we would find 85,728 cavities in temporary teeth and 6,300 cavities in permanent teeth in children in the first grade. In regard to the latter, the infirmary certainly should be able to care for all, though, if the first permanent molar problem is solved without resort to forceps, as it should be, and if all roots that need filling be properly filled, a radiograph of the result being filed with the record as proof of the operator's success, the infirmary might find little time left for other school grades.

In regard to the temporary teeth, it would be necessary to decide whether extraction, with the possible inducement of malocclusion, or the retention of infected teeth where time is lacking for their salvation, would best serve the interests of the child.

Perhaps if the infirmary devoted all its time to the first grade alone, it might save all teeth that are savable. Experience alone will tell.

**Number of
Nurses Needed
in Boston.**

Last month we suggested that the Forsyth Infirmary might have a training school for dental nurses, educating and using from fifty to sixty women. Now we find that in Bridgeport Dr. Fones has cared for all the first grade children and over 800 of the second grade with a corps of eight hygienists, which number has recently been increased to ten. When we remember that these women carry their equipment about with them, the equipment consisting of a fold-

ing dental chair, a cabinet and a dental engine, and that they must work in any odd unoccupied corner, and then picture the elaborate outfit in the Forsyth Infirmary, we can but believe that thirty or forty nurses in that institution could easily accomplish all that the Bridgeport women are doing, the Boston first grade being just about four times as large as that in Bridgeport.

**Saving the
Permanent
Teeth.**

But let us for a moment return to a consideration of the caries of the permanent teeth. In 3,826 children in the first grade in Bridgeport the hygienists found 1,575 cavities in permanent teeth, that is to say about forty per cent. of the children had one cavity each in permanent teeth.

It is fair to presume that the children now in the second grade would have exhibited about the same ratio of caries had they been examined while in the first grade. In the mouths of 840 of these second grade children the hygienists found 742 cavities in permanent teeth. Thus in the second grade the percentage is almost ninety per cent. having one carious permanent tooth, an increase from forty per cent. to ninety per cent. in one year.

In the Bridgeport experiment, without the aid of a curative clinic where the existing cavities in the permanent teeth of the first grade children could be filled, suppose that a year from date it could be shown that the second grade children, after one year of prophylactic training and care by the Fones corps of dental hygienists, would have but fifty or sixty per cent. with caries in permanent teeth, would not the dental hygienist have proven her efficiency?



Around the Table

WE SAY WE WILL NOT, and then we do! Did you ever notice that?

- ◆ Better not make promises even to yourself, because you never can tell!
- ◆ Haven't I promised myself, more than once not to talk business methods
- ◆ in *Items of Interest*, and wasn't I beguiled into doing so in the October
- ◆ number, just because some men wrote me clever letters! And even as
- ◆ I did it, did I not speak of "my reluctance to launch this magazine into
- ◆ any campaign of business talks?" And then in order to reply to my
- ◆ Kentucky friend, I was forced to resume the talk in November, and that
- ◆ was where I mired in up to the knees, and now I am compelled to dig
- ◆ myself out, as it were. But let me explain.



THE HOTEL ORMONDE is in Brooklyn, Borough of Brooklyn, City of

- ◆ New York, State of New York. The invitations to the last meeting of
- ◆ the Second District Dental Society mentioned that there would be a
- ◆ dinner first, at the Ormonde, and then further stated that the Ormonde
- ◆ is "on Fulton Street, between Bedford and Nostrand Avenues." The
- ◆ traveller from New York (the original little old New York, which is on
- ◆ Manhattan Island) goes part way by subway and under-the-river tube,
- ◆ and thence by trolley. In this manner he arrives at Bedford Avenue
- ◆ first, and as the trolleys in Brooklyn stop but once in each block, even
- ◆ though a Brooklyn block is the same as a half-mile or so in any other
- ◆ city, I ask any kind friend would he not have debouched, as it were, from
- ◆ the trolley at Bedford Avenue, walking thence in the general direction
- ◆ of Nostrand Avenue, with eyes upon the house signs and numbers,
- ◆ searching for the Hotel Ormonde?



WELL KIND FRIEND that is where you would have made a mistake. Now

- ◆ I am not denying that the Hotel Ormonde is between Bedford and
- ◆ Nostrand Avenues, but I would like to just mention that after arriving
- ◆ at the Ormonde entrance, if you walk ten feet further, you will be at
- ◆ Nostrand Avenue.


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HOWEVER, I AM COMPELLED to admit that this fact did not trouble

- ❖ me, because I went over in a \$3,000 automobile belonging to one of my friends and came back in a \$6,000 limousine belonging to another. There was some right friendly chat in that limousine, too, but as there were three dental hygienists in the party, it was all confidential. But what happened at the Ormonde was different, especially as it happened mainly to me.



I WAS REALLY HAVING a mild but merry little time at a table where

- ❖ half of the diners were of the fair sex, when I heard the following words
- ❖ at a nearby table. "The point is this: ITEMS OF INTEREST has so much influence in this Society that I am sorry to see the editor recommending
- ❖ what I consider unethical methods to young men just starting in."
- ❖ Naturally after that I lost my appetite for the caviar, and had to go over and ask when I did it.



THE CHIEF SPEAKER was our delegate to the Executive Council of the

- ❖ State Society, so I will just call him the Councilman. I asked the Councilman to explain, and he certainly did explain. He spoke somewhat as follows:



"IN YOUR TABLE TALK for November," said he, "I take exception to one

- ❖ piece of advice. You recommend that young men starting in dental practice should set a high price upon their services, and then when working for less, to tell the patient that she must consider herself in debt until she can send him patients who will pay as much as he has reduced his charges. In my opinion there is no difference between that method and offering commissions to patients to act as agents. In fact it is an advertising scheme, pure and simple, and is little if any better than throwing handbills away in the street. I am perfectly frank you see, and tell you openly you should never have printed that sort of stuff. There, I have said my say, now what is your answer?"



"I MIGHT TELL you a story," said I. "This is the story. Mrs. Flannigan

- ❖ called on Mrs. Maloney, and Mr. Maloney was at home and busy writing. 'What are ye writin', Mike?' said Mrs. Flannigan. 'Faith,' said Maloney, 'I'm writin' down a list of all the min in this ward that I can lick.' 'And by any chance,' said Mrs. Flannigan, 'does the name of Patrick Flannigan decorate the list that ye are inscribing?' 'It do,' said Maloney. 'Indade I find that name at the very top of the list.' Mrs. Flannigan returned to her home, and reported the interesting facts to her spouse, who without words of comment got into his street jacket, took down his blackthorne stick and leisurely strolled around to the house of his friend, Maloney. Upon arriving, and having exchanged greetings, he casually remarked: 'Maloney, it has been reported to me by wan whom I trust that ye have made a list of min ye can lick, and that my name is therein mentioned?' 'Ye have it right,' said Maloney. 'I may have it right,' said Flannigan, "but ye have it wrong. Ye can't lick me, and if ye doubt me word, come outside and we'll settle the dispute

Around the Table

- ♦ as between min.' 'Oh, well' said Maloney, 'if ye feel that way about it,
♦ I'll just scratch your name off me list.'

■ ■ ■

THE MEN AT TABLE all laughed, but really it is no laughing matter.

- ♦ The trouble with putting anything into print is that it remains in print
- ♦ a long time. The facts are as follows. My Kentucky correspondent,
- ♦ whose letter was quoted in part, in the October issue, when asking for
- ♦ a discussion of methods of beginning practice available by young men.
- ♦ did not ask for my own personal experiences. Indeed in the actual
- ♦ letter he suggested, by name, one or two men whose opinions might be
- ♦ helpful. It happened that when writing what was published, I recalled
- ♦ that a certain dentist of international reputation, once in my hearing was
- ♦ discussing this whole question and outlined the plan, which I undertook
- ♦ to give.

■ ■ ■

UNFORTUNATELY IT DID NOT occur to me that any such construction

- ♦ might be put upon it, as evidently has been, or most assuredly it never
- ♦ would have appeared in these pages. The Councilman, however, was not
- ♦ the first to criticize. I received a letter from a young graduate asking
- ♦ what was the difference between the plan recommended, and the man
- ♦ who sends his friends to a certain furniture store, and then goes around
- ♦ and collects a commission. There really is no similarity whatever, but
- ♦ it is very evident that I have unintentionally given out an impression
- ♦ which was far indeed from my thoughts. And as I study over the lan-
- ♦ guage used I conclude that I expressed myself very badly. Can one say
- ♦ more?

■ ■ ■

BUT MORE MUST BE SAID. It is rather annoying to be called upon to

- ♦ defend a proposition which really was not my own, and which never in
- ♦ the slightest degree has been practiced by myself. However, as the In-
- ♦ ternational Person who suggested the scheme within my hearing is him-
- ♦ self a perfectly ethical dentist, I feel that, anonymously, I have misrep-
- ♦ resented him. So now let me try to explain the plan as perhaps it was
- ♦ really meant.

■ ■ ■

AT THE OUTSET it was recommended that early in his career the young

- ♦ dentist should fix a fair fee for his services. It was shown how difficult
- ♦ it is to increase one's fees for patients for whom one has worked for
- ♦ several years. No one I think will see anything unrighteous in this
- ♦ course. Next we come to the visit of a person who cannot afford to pay
- ♦ the sum which you think is a fair and proper fee for the service needed.
- ♦ Three courses are open to you. You may say: "I am sorry, but I never
- ♦ reduce my charges." Would that be entirely ethical? Secondly, you may
- ♦ say: "Very well, Madam, tell me what you can afford and I will do your
- ♦ work." That would be perfectly ethical, of course, but would it be wise
- ♦ or business-like? What is the third course? It is the plan which I tried
- ♦ to explain, and which I evidently described very badly.

■ ■ ■

RIGHTLY OR WRONGLY we all feel that, entirely regardless of the actual

- ♦ payment of our charges, our patrons owe us something. Because of our



Items of Interest

- ❖ notions of ethics we debar ourselves from the advertising methods by
- ❖ which the commercial man attracts business. How then are we to get
- ❖ business? If when a patient pays a fee he feels that he has entirely
- ❖ cancelled his obligation, then, of course, he does not go among his friends
- ❖ acting as our "agent," to quote the word of the Councilman. But having
- ❖ abandoned the advantages of advertising methods, is it not true that we
- ❖ do expect our patients to go about advising their friends to come to us?
- ❖ How do we bring this about? Usually by doing for the patient something
- ❖ more than the bare service for which he pays. You may fill a tooth,
- ❖ make a charge, collect, and dismiss the patient. In that case you are
- ❖ charging and receiving pay for all that you do. Again you may fill the
- ❖ tooth, extending great sympathy for any pain inflicted, hoping it will
- ❖ not occur again, using a gentler touch next time, pausing at every evi-
- ❖ dence of distress, patiently stopping work at the patient's request, and
- ❖ thus and in a hundred other ways doing those little things that cannot
- ❖ be entered nor itemized in a ledger, but which creates an obligation on
- ❖ the side of the patient, an obligation which he cancels by recommending
- ❖ his friends.

■ ■ ■

THUS WE DO HOPE that our patients will act as our agents among their

- ❖ friends, and we feel entitled to this because we have given more than we
- ❖ have charged for. Very well. Thus far we are entirely ethical. Now
- ❖ the plan the International Person advocated was that to avoid getting the
- ❖ reputation of working for low prices, the young man, might fix a proper
- ❖ fee at the outset, and get it as often as possible. Then if he accepts a
- ❖ smaller fee, this Person advised that he should let the patient under-
- ❖ stand that the lowering of the fee creates an obligation which may be
- ❖ met not in money, but in recommending his friends.

■ ■ ■

THERE CERTAINLY is no analogy between this and paying a man a com-

- ❖ mission for sending customers to a furniture shop. In the former case
- ❖ the "agent," if you must call him so, works in gratitude for a service
- ❖ rendered at a cost less than its full value. In the latter the "agent" is
- ❖ working entirely for financial profit for himself. The plan I am sure was
- ❖ not conceived in any unethical spirit, yet under a very strict ruling it
- ❖ may be unethical. I do not know, never having tried it.

■ ■ ■

WE ALL EXPECT our patients to recommend their friends, but perhaps

- ❖ we should not ask them to do so. I certainly never have. And so, of
- ❖ course, if we take half a fee, perhaps we should not intimate to the
- ❖ patient that he is under an obligation. Probably he would know it with-
- ❖ out being told. Therefore I regret having published the plan.

■ ■ ■

ONCE MORE I PROMISE myself to keep business talks out of this maga-

- ❖ zine.



National Society Meetings.

PANAMA-PACIFIC DENTAL CONGRESS, San Francisco, Cal., August 30 to September 9, 1915.

Secretary, Dr. Arthur M. Flood, 240 Stockton St., San Francisco, Cal.

State Society Meetings.

ALABAMA DENTAL ASSOCIATION, Montgomery, Ala., April 13, 1915.

Secretary, Dr. J. A. Blue, Birmingham, Ala.

ARIZONA STATE DENTAL SOCIETY, date and place will be announced later.

Secretary, Dr. J. L. O'Connell, Phoenix, Arizona.

ARKANSAS STATE DENTAL ASSOCIATION, Little Rock, Ark., May 13-15, 1915.

Secretary, Dr. W. B. Dormon, Nashville, Ark.

COLORADO STATE DENTAL ASSOCIATION, June 17, 18, 19, 1915.

Secretary, Dr. Earl W. Spencer, 119-120 Pope Block, Pueblo, Colo.

CONNECTICUT STATE DENTAL ASSOCIATION, Hartford, Conn., April 20-22, 1915.

Secretary, Dr. E. R. Bryant, New Haven, Conn.

FLORIDA STATE DENTAL SOCIETY, date and place will be announced later.

Secretary, Dr. Alice P. Butler, Gainesville, Fla.

**Items of Interest**

ILLINOIS STATE DENTAL SOCIETY, Peoria, Ill., May 11-14, 1915.

Secretary, Dr. Henry L. Whipple, Quincy, Ill.

INDIANA STATE DENTAL ASSOCIATION, Indianapolis, Ind., May 18-20, 1915.

Secretary, Dr. A. R. Ross, Lafayette, Ind.

IOWA STATE DENTAL SOCIETY, Waterloo, Ia., May 4-6, 1915.

Secretary, Dr. C. M. Kennedy, Des Moines, Iowa.

KENTUCKY STATE DENTAL ASSOCIATION, Ashland, Ky., June 8-10, 1915.

Secretary, Dr. Chas. R. Shacklette, The Atherton Bldg., Louisville, Ky.

MARYLAND STATE DENTAL ASSOCIATION, Baltimore, Md., June 11-12, 1915.

Secretary, Dr. F. F. Drew, 701 N. Howard St., Baltimore, Md.

MASSACHUSETTS DENTAL SOCIETY, Boston, Mass., May 5-7, 1915.

Secretary, Dr. A. H. St. C. Chase, Everett, Mass.

MINNESOTA STATE DENTAL ASSOCIATION, date and place will be announced later.

Secretary, Dr. Max E. Ernst, 614 Lowry Bldg., St. Paul, Minn.

MISSISSIPPI DENTAL ASSOCIATION, Jackson, Miss., April 20-22, 1915.

Secretary, Dr. M. B. Varnado, Osyka, Miss.

MISSOURI STATE DENTAL ASSOCIATION, Golden Jubilee Meeting, Jefferson City, June 10-12, 1915.

Secretary, Dr. S. C. A. Pubey, New York Life Bldg., Kansas City, Mo.

MONTANA STATE DENTAL SOCIETY, date and place will be announced later.

Secretary, Dr. F. W. Adams, Chicago Block, Billings, Montana.

NEW HAMPSHIRE STATE DENTAL SOCIETY, date and place will be announced later.

Secretary, Dr. Louis I. Moulton, 15 No. Main St., Concord, N. H.

NEW JERSEY STATE DENTAL SOCIETY, Asbury Park, July 21-24, 1915.

Secretary, Dr. John C. Forsyth, 430 E. State St., Trenton, N. J.

NEW MEXICO STATE DENTAL SOCIETY, Albuquerque, N. M., date will be announced later.

Secretary, Dr. J. J. Clarke, Artesia, N. M.

NEW YORK STATE DENTAL SOCIETY, Albany, N. Y., May 13-15, 1915.

Secretary, Dr. A. P. Burkhardt, 52 Genesee St., Auburn N. Y.

NORTH CAROLINA DENTAL SOCIETY, Wrightsville Beach, N. C., June 23-25, 1915.

Secretary, Dr. R. M. Squires, Wake Forest, N. C.

Society Announcements

OHIO STATE DENTAL SOCIETY, Columbus, Ohio, December 7-9, 1915.

Secretary, Dr. F. R. Chapman, 305 Schultz Bldg., Columbus, Ohio.

OKLAHOMA STATE DENTAL SOCIETY, Oklahoma City, Oklahoma, March 15-19, 1915.

Secretary, Dr. C. R. Lawrence, Enid, Oklahoma.

PENNSYLVANIA STATE DENTAL SOCIETY, Reading, Pa., June 22-24, 1915.

Secretary, Dr. L. M. Weaver, Philadelphia, Pa.

SOUTH CAROLINA STATE DENTAL ASSOCIATION, Columbia, S. C., April 13-16, 1915.

Secretary, Dr. Ernest C. Dye, Greenville, S. C.

TENNESSEE STATE DENTAL ASSOCIATION, Sewanee, Tenn., June 24-26, 1915.

Secretary, Dr. C. Osborn Rhea, 625½ Church St., Nashville, Tenn.

TEXAS STATE DENTAL ASSOCIATION, Galveston, Texas, May 19-22, 1915.

Secretary, Dr. W. C. Talbot, Fort Worth, Texas.

UTAH STATE DENTAL SOCIETY will meet in San Francisco, Cal., during the Panama-Pacific Dental Congress in August, 1915.

Secretary, Dr. E. C. Fairweather, Boston Bldg., Salt Lake City, Utah.

VERMONT STATE DENTAL SOCIETY, May 19-21, 1915.

Secretary, Dr. P. M. Williams, Rutland, Vt.

VIRGINIA STATE DENTAL ASSOCIATION, Richmond, Va., Nov. 4-6, 1915.

Secretary, Dr. C. B. Gifford, Norfolk, Va.

W. VIRGINIA STATE DENTAL SOCIETY, Wheeling, W. Va., April 14-16, 1915.

Secretary, Dr. J. W. Parsons, Huntington, W. Va.

WISCONSIN STATE DENTAL SOCIETY, Oconomowoc, Wis., July 13-15, 1915.

Secretary, Dr. O. G. Krause, 1209 Wells Bldg., Milwaukee, Wis.

Rules Governing Clinicians and Essayists of the Panama-Pacific Dental Congress.

RULE VI.

"Papers may be read and discussed before the Congress in any language, but copies of all papers, or summaries of papers and discussions, typewritten in the English language, ready for printing, must reach the Program Committee in San Francisco, not later than May 1, 1915."

RULE VII.

"Each paper and discussion will be printed in full in the published transactions of the Congress, but a maximum of twenty minutes only will be allowed for the reading of a paper, or a summary of it, embracing its leading points, in case the reading of the original would occupy more

than the allotted time, and five minutes for each speaker taking part in the discussion; not more than fifteen minutes will be allowed for the discussion of any paper, and the author will be allowed five minutes in closing the discussion.

"The author of each paper is requested to furnish the Secretary of the Section to which his paper belongs with the names and addresses of those who will discuss his paper."

RULE VIII.

"No clinic will be given a place on the program of the Congress unless a concise description of it, typewritten in the English language, ready for printing, reaches the Clinic Committee in San Francisco, on or before May 1, 1915."

**The Panama Pacific Dental Congress is to be held at San Francisco,
August 30th-September 9th, 1915.**

The Transportation Committee are recommending the following plan and schedule of railway rates from New York, Chicago and other points of the East to San Francisco and return.

Following the usual custom and in order that all those who desire to attend the Panama-Pacific Dental Congress at San Francisco, August 30th to September 9, 1915, may do so with the maximum of comfort and pleasure and minimum of fatigue and inconvenience, the Transportation Committees announce that arrangements have been made for special train service. The present plan is to have three special trains from Chicago leaving as follows:

First train, leaves Chicago on August 21st, going via Kansas City and the Santa Fe. Stop-overs will be made at Colorado Springs, Isleta Indian Village, the Grand Canyon, Redlands, Riverside, San Diego and Los Angeles.

Second train, leave Chicago on August 24th, going via Denver D. & R. G. and Western Pacific. Train two includes stop-overs of one day in Colorado Springs and special attention has been given to the schedule so that our party will pass through the scenic points of interest in daylight.

Third train, leave Chicago on August 25th, going via Denver, the D. & R. G. and Western Pacific as in route two. It will be noted that the two trains, that is, the trains leaving Chicago on the 24th and 25th, will meet in Colorado Springs and proceed from there in one or two trains according to the number who will take this route. It will also be noted that all the trains have been arranged so as to arrive in San Francisco one day prior to the opening of our convention.



There is a possibility that the number from the East will be sufficiently large to warrant the running of a special train right through from New York, in which case the Eastern and Chicago, and in vicinity parties, will be consolidated and go as one train from Chicago. In the events that there is not a sufficient number to warrant the running of a special train from New York, special through sleepers will be provided and will run through from New York to San Francisco on all of the three schedules outlined.

For the advance information of those interested in the trip the Transportation Committees have endeavored to show briefly what the schedules of the trains will be. A circular outlining the trip in detail will be prepared sometime in the near future and will be distributed generally to members of the association.

TRAIN SCHEDULE I.

Lv. Boston 2:00 P.M. Aug. 20th Via Boston and Albany
Lv. New York 5:00 P.M. " " Via N. Y. Central Wolverine
Ar. Albany 8:15 P.M. " "

(Connect with trains from Boston and other points in New England States.)

Ar. Schenectady 8:47 P.M. Aug. 20th Via N. Y. Central Wolverine
Ar. Utica 10:23 P.M. " " "
Ar. Syracuse 11:40 P.M. " " "
Ar. Rochester 1:20 A.M. " 21st "
Ar. Buffalo 3:10 A.M. " " "
(eastern time)
Ar. Detroit 7:10 A.M. " " "
(central time)
Ar. Chicago 2:00 P.M.
(central station)

Those desiring a less expensive train to Chicago can leave Grand Central Terminal 2:00 P.M., August 20th, due Chicago 5:00 P.M., August 21st. No extra fare is charged on this train.

Lv. Chicago 6:10 P.M. Aug. 21st Via Chic. Burlington & Quincy
Ar. Kansas City 8:00 A.M. " 22nd
Lv. Kansas City 11:00 A.M. " " Via Atchinson, Topeka, and
Ar. Colorado Springs 6:30 A.M. " 23rd Santa Fe
Lv. Colorado Springs 8:30 P.M. " "
Ar. Albuquerque 1:20 P.M. " 24th
Lv. Albuquerque 2:00 P.M. " "
Ar. Isleta 2:30 P.M. " "
Lv. Isleta 4:00 P.M. " "
Ar. Grand Canyon 5:00 A.M. " 25th
Lv. Grand Canyon 8:00 P.M. " "
Ar. Redlands 12:30 P.M. " 26th

Items of Interest

Lv. Redlands	2:30 P.M.	"	"
Ar. Riverside	3:30 P.M.	"	"
Lv. Riverside	11:59 P.M.	"	"
Ar. San Diego	7:00 A.M.	"	27th
Lv. San Diego	11:59 P.M.	"	"
Ar. Los Angeles	7:00 A.M.	"	28th
Lv. Los Angeles	8:00 P.M.	"	" Via Southern Pacific
Ar. San Francisco	9:45 A.M.	"	29th
Railway fare from New York to San Francisco via the above route and returning via any direct route (plus \$7.50 for Canyon)			\$98.80
The Wolverine--Fast Express New York to Chicago--extra charge			6.00

Railway fare from Chicago to San Francisco going via the above route and returning via any direct route.....	\$62.50
Lower berth from New York to Chicago.....	5.00
Lower berth, Chicago to San Diego (estimated).....	18.50
Lower berth, San Diego to Los Angeles.....	1.50
Lower berth, Los Angeles to San Francisco.....	2.50
Side trip from Williams to Grand Canyon and return.....	7.50

There are many passenger trains from New York to Chicago.

The faster trains are more expensive. The fare on the slower trains is less. Either can be utilized in making connection with the following schedule:

TRAIN SCHEDULE II.

Lv. Chicago	11:00 P.M.	Aug. 24th	Via C. B. & Q.
Ar. Denver	7:00 A.M.	" 26th	
Lv. Denver	8:00 A.M.	" "	Via D. & R. G.
Ar. Colorado Springs	10:30 A.M.	" "	
Lv. Colorado Springs	10:30 A.M.	" 27th	
Ar. Salt Lake City.....	12:30 P.M.	" 28th	
Lv. Salt Lake City.....	1:00 P.M.	" "	Via Western Pacific
Ar. San Francisco	5:00 P.M.	" 29th	

Railroad fare from Chicago to San Francisco going via the above route and returning via any direct route.....	\$62.50
Returning via Portland, Oregon.....	80.00
Lower berth, Chicago to San Francisco (estimated).....	15.00



Society Announcements

TRAIN SCHEDULE III.

Lv. Chicago	11:00 P.M.	Aug. 25th	Via C. B. & Q.
Ar. Denver	7:00 A.M.	" 27th	
Lv. Denver.....	8:00 A.M.	" "	Via D. & R. G.
Lv. Colorado Springs	10:30 A.M.	" "	
Ar. Salt Lake City.....	12:30 P.M.	" 28th	
Lv. Salt Lake City.....	1:00 P.M.	" "	Via Western Pacific
Ar. San Francisco	5:00 P.M.	" 29th	

Rates will be the same as route II except that a standard lower berth from Chicago to San Francisco will be..... \$13.00
By the Northern Routes to San Francisco and return by a central or southern route, there is an added fee of..... 17.50

Applications for space should be addressed to Mr. C. E. Colony, City Ticket Agent, B. & A. Road, Boston, Mass., or Mr. W. V. Lifsey, General Eastern Passenger Agent, New York Central Lines, 1216 Broadway, New York City.

TRANSPORTATION COMMITTEE NATIONAL DENTAL ASSOCIATION.

DR. VICTOR H. JACKSON (Chairman), New York.

DR. H. F. HOFFMAN, Denver, Colo.

DR. JOS. D. EBY, Atlanta, Ga.

DR. D. C. BACON, Chicago, Ill

DR. HENRY W. WEIRICK, San Francisco, Cal.

DR. J. P. MARSHALL, St. Louis, Mo.

TRANSPORTATION COMMITTEE PANAMA PACIFIC DENTAL CONGRESS.

DR. HENRY W. WEIRICK (Chairman), San Francisco.

DR. HARRY P. EVANS, N. Y.

DR. ALPHEUS R. BROWN, Boston, Mass.

DR. E. M. CARSON, St. Louis, Mo.

DR. F. W. GETHRO, Chicago, Ill.

DR. JOS. D. EBY, Atlanta, Ga.

Free Course of Instruction Given by College of Dentistry University of Illinois.

Beginning Monday evening, February 8th, and continuing every Monday evening through February and March. The course will be given in the Amphitheatre of the College Building, 1838 W. Harrison St., corner Honore, beginning promptly at 8 o'clock each evening and

lasting one hour. The course is open without cost to ethical practitioners of dentistry and medicine.

I. LOCAL ANESTHESIA.

1. General principles governing local anesthesia.
2. Infiltration and conductive anesthesia.
3. Choice of drug.
4. Novocain; its toxicity, irritability, etc.
5. Preparation of solution.
6. Selection of syringe and needles.
7. Technique of injections, illustrated by stereopticon and actual demonstrations on patients. These demonstrations will include the application of novocain in major and minor oral surgery, extraction of teeth, pulp removal, cavity preparation, etc.

FREDERICK B. MOOREHEAD.

II. NITROUS OXIDE AND OXYGEN.

Anesthesia and analgesia.

A discussion covering the use of nitrous oxide and oxygen for anesthesia and analgesia purposes with demonstrations illustrating technique, selection of outfit, etc. Application of these agents in cavity preparation, and pulp removal illustrated on patients.

LOUIS SCHULTZ.

III. ENAMEL CLEAVAGE.

Illustrated by stereopticon.

1. Structural elements of enamel; their arrangement and character of the tissue.
2. Effect of caries on the structure of the enamel.
3. Cleavage of enamel; the relation of the cutting instruments to the structural elements of the tissue in cutting enamel.
4. The arrangement of the structural elements in a strong enamel wall.
5. The preparation of typical cavity walls.

FREDERICK B. NOYES.

IV. THE MOUTH AS A FACTOR IN PATHOGENESIS.

1. Irritation.

Difficult to measure harm of irritants.

The delinquent boy and girl.

Impacted and unerupted teeth, irregular teeth, contracted arch, adenoids, faulty breathing, etc.

Tartar, gingivitis, endarteritis, etc.

Ulceration of mucosa.

2. Neoplasms.

3. Malformations.

4. Infection.

- (a) Granulomata; tuberculosis; syphilis, actinomycosis, etc.
- (b) Acute infections; danger; relation to deep cervical fascia, glottis, maxillary sinus, etc.
Sub-periosteal abscess; necrosis, ankylosis, septicemia, etc.
- (c) Sub-acute or chronic.
Patients "below par."
Pyorrhea.
Bone cavities; roughened apices, etc., illustrated by stereopticon.

The interpretation of X-ray plates and films; the question of resection of root-ends, curettage and extraction of teeth. When shall teeth be removed and when shall resection and curettage be resorted to? Infective cysts, joint lesions, rheumatism, endocarditis, neuritis, eye infection, ulcers of stomach and duodenum, appendicitis, etc., etc.

The relation of local foci of infection to general disease is doubtless the most acute and serious question in medicine to-day. The jaws and tonsils furnish the greatest number of these foci. The dentist has a very definite and vital relation to the question of infection and, therefore, a very serious responsibility to face.

This whole matter will be carefully discussed in detail and brought close to the general practitioner.

FREDERICK B. MOOREHEAD.

V. RELATION OF CERTAIN METABOLIC DISTURBANCES TO THE OSSEOUS SYSTEM AND TO THE TEETH.

- (a) A discussion of the function of the thyroid and thymus glands, the hypophysis and other glands furnishing internal secretions.
- (b) The changes occurring in the bones and teeth in rachitic, scurvy, etc.
- (c) Diet and the subject of "vitamines."
- (d) Results of experimental studies with demonstrations.

D. J. DAVIS.

Alumni Association of the University of Buffalo, Dental Department.

The Fifteenth Annual Meeting of the Alumni Association Dental Department of the University of Buffalo will be held Friday and Saturday, February 5-6, 1915, at the Hotel Iroquois, Buffalo, N. Y.

Dr. C. N. Johnson, of Chicago, will read a paper entitled: "Certain Phases of Pulp Canal Treatment." Men of international reputation have been secured to talk and give practical demonstrations on the subjects requested by the members of the Alumni, namely: Pyorrhea, Anaesthesia,

Analgesia, Attachments for Removable Bridgework, Anatomical Occlusion, Porcelain and Gold Inlays and Radiography.

Friday evening an informal dinner will be given in honor of our guests, and the classes of 1895 and 1905 will hold their twentieth and tenth anniversaries.

The exhibitor's display will surpass that of any previous year. The room will be open during the entire meeting. All ethical dentists are cordially invited.

D. H. McCoy, President.

E. J. FARMER, Secretary.

The Oklahoma State Dental Society.

The next meeting of this society will be held in Oklahoma City, March 15, 16, 17, 18, 19, 1915.

The meeting will be conducted somewhat along the same lines (the post-graduate plan) that has proven so valuable in this State the past few years.

The principal lecturers will be Drs. J. H. Prothero and W. H. G. Logan, of Chicago. Dr. Prothero's lectures will be confined to important phases of Prosthetic Dentistry, while Dr. Logan will give lectures on modern methods of treating "Pyorrhea" and local anæsthesia.

Reputable dentists from out of the State are welcome to this meeting, but are required to pay a fee of five dollars for the lectures and clinics.

C. R. LAURENCE, Secretary

Enid, Okla.

Southern Minnesota District Dental Society.

The Southern Minnesota District Dental Society will hold its annual meeting April 12th, 13th, and 14th, at Mankato, Minnesota.

A literary and clinical program will be carried out.

G. W. NORRIS, Secretary.

Tracy, Minn.

South Carolina State Board of Dental Examiners.

The next annual meeting of the South Carolina State Board of Dental Examiners will be held at Columbia, S. C., beginning at 9 A. M., Tuesday, June 15, 1915.

All applications must be in the hands of the Secretary not later than June 5, 1915.

Application blanks and instructions for applicants may be obtained by addressing,

R. L. SPENCER, Secretary.

Bennettsville, S. C.



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Some Morphological Changes in the Jaw Bones Produced by Orthodontic Treatment.*

By MILO HELLMAN, New York, N. Y.

In the study of vital processes in general, it is essential to understand some fundamental truths underlying all biological phenomena. It would be as fruitless to undertake a consideration of the form changes in the jaws without a general knowledge of what transpires within the structures constituting these bones, as it would be a waste of time and energy to enter upon a detailed description of the construction of a complicated machine without pre-supposing a definite understanding of the principles of physics. In order, therefore, to avoid any misconception of what I have to bring before you, let me imagine, for the sake of thoroughness, that you are not familiar with the processes involved, and allow me to place this problem in a manner as would be conducive to a clear understanding.

As maintained by Prof. T. H. Morgan, of Columbia University (1), "animals and plants are so constituted that one of their chief characteristics is

Adaptation. that they respond to their natural environment in such a way as to insure their continued existence. These responses are in the main physiological, and therefore in large part transitory; but in some cases the response is structural, involving a temporary or even a permanent change in form and structure that persists, at least, as long as the external con-

*Read at the meeting of the Central Dental Association, Newark, N. J., October, 1914. A paper under the same title but of a more rudimentary character was also read by the author at the annual meeting of the Vermont State Dental Society in May, 1914.

ditions that called it forth remain. Thus, external conditions sometimes cause adaptive structural changes in organisms. We are familiar with some effects of this sort in our own bodies. Pressure on the skin, if long continued, causes it to become thicker and more capable of resisting the injurious effects of pressure. Sunlight tans the skin and protects it from 'burning.' It is said that cold causes the furs of some mammals to become thicker, and this change better protects them from cold. Conversely, it is said that horses and dogs lose their hair to some extent in warm climates. A number of arctic animals become white in winter. This change seems to be in part due directly to the cold, for it has been found if these animals are transferred to warmer climates, they show less marked changes on the approach of winter." The changes, evidently, seem to be of benefit to the animal, directly protecting it from the agent that brings about the result as in the effects of pressure, cold, sunlight, etc.

If an inquiry be undertaken to determine the factors concerned in the processes that bring about these changes, we would discover that at the root of all vital phenomena there are involved millions of cells through whose activity all bodily functions are performed. It is the recognition of the cell theory during the last hundred years that has changed the knowledge of living organisms. Thus it is now sufficiently established that the cell is the structural unit of all living things, both in plant and in animal, and that all manifestations of life are accomplished by the chemical activity of the substances constituting the cell. As a result of this activity, the vegetative functions are performed, and the materials, termed intercellular substances, produced. The cells, then, together with the materials produced by their functional activity, compose the tissues of all living organisms. Furthermore, as Noyes (2) maintains, "all tissues are made up of cells and intercellular substances; the vital characteristics are given to the tissue by the cells, the physical characteristics by the intercellular substance. The intercellular materials present none of the vital manifestations, and are entirely dependent upon the cells for their formation and maintenance." There is, therefore, a constant reaction between the cell and the intercellular substance. If some bone cells, or bone corpuscles, of a living bone be devitalized, that portion of the tissue will become necrosed and form a sequestrum, the relation of which to the vital tissue is that of a foreign body. Also the fibres of fibrous tissue have no ability to grow, to attach themselves to any surface, or even to maintain their form without the presence of living fibrous cells *or fibroblasts*.

Adaptability of Connective Tissue.

The most characteristic peculiarity of living things, as Prof. Morgan maintains, is their ability to respond to the influences of their environment in such a way as to become better and better adapted to it. This property of adaptability in its widest sense, is the most significant characteristic of connective tissue, which, from the beginning of its development until it reaches the adult type, undergoes such changes as would render it most efficient to meet every possible requirement of its physical environment. This adaptation, brought about by the activity of the cells of that tissue invariably results either in an increased amount of intercellular substance, a destruction of this material, or a change of its character.

Characteristics of Connective Tissue.

Histology has taught us that the cells of connective tissue in general are very similar, and that the different forms of this tissue depend chiefly on the character and arrangement of their intercellular substance. In embryology we similarly learn that all connective tissues originate from a common form of embryonal connective tissue—the mesenchyme—and change from one form to another during development. These changes are the most important characteristics of this tissue and must be clearly perceived, if the nature of bone is to be appreciated. For instance, embryonal connective tissue is transformed into fibrous tissue; fibrous tissue becomes arranged into a definite membrane and is then transformed into cartilage, which in turn is infiltrated by calcareous deposits to adapt itself to its environment. Just as epithelial cells are specialized to respond to the stimuli of light, of pressure and of chemical action, which connect the organism with its environment, so connective tissue cells are specialized to respond to mechanical stimuli by producing materials which adapt it to mechanical conditions.

Bone.

Approaching our topic more closely, let us consider for a moment the tissue that most concerns us, namely, *Bone*. Dr. F. B. Noyes defines bone as "*a connective tissue whose intercellular substance is calcified and arranged in layers around nutrient canals or spaces*. The cells are placed in cavities, called lacunæ, between the layers, and receive their nourishment through very minute channels, called canaliculi, which radiate from them and penetrate the layers."

The structural elements of bone are:

1. The matrix, or intercellular substance, which is always arranged in layers or lamellæ.

2. The cells or bone corpuscles which are embedded in the matrix between its layers.
3. The lacunæ or spaces in which the cells are found.
4. The caniculi or channels through the matrix by which the embedded cells receive nourishment.

Although these structural elements are present in all forms of bone, the varieties of this tissue may be classified according to the difference in arrangement of these elements. Noyes distinguishes the following three varieties of bone; Subperiosteal, Haversian system and cancellous. *Subperiosteal bone*, according to him, "must be regarded as primarily a formative arrangement and more or less transitory, in which the layers are arranged parallel with the surface under the periosteum. In the *Haversian system* bone the lamellæ are arranged concentrically around canals which contain blood vessels, nerves, and embryonal connective tissue, and from which the cells in the lacunæ are nourished. In cancellous bone the lamellæ are arranged in delicate plates surrounding large, irregular nutrient or marrow spaces. These are filled by embryonal connective tissue and contain blood vessels and nerves."

Transformation of Bone. Under normal conditions the subperiosteal bone is composed of but a few layers. But when a considerable thickness is reached, processes are immediately set up, which begin to hollow out its substance by absorptions, and bone is rebuilt in the form of layers arranged concentrically around the channels formed. In this manner subperiosteal bone is converted into Haversian system bone. Between the Haversian systems there are remains of the subperiosteal layer (interstitial lamellæ) that were left by the absorption, and for that reason are called fundamental lamellæ or ground lamellæ. Haversian system bone is also called compact bone and constitutes the greater part of the shaft of the long bone and plates of the flat and irregular bones. This is never allowed to become greater in quantity than is necessary for strength, and when sufficient thickness has been formed, the deeper part is cut out by absorptions in the Haversian canals, converting them into large irregular spaces. The formation of a few layers around these spaces transforms the compact into cancellous bone. The plates of cancellous bone, however, are not arranged at haphazard, as might be supposed from casual observation, but are disposed of in definite arrangement, which is determined by the direction of stress on the compact bone that is supported by them. And finally the inner circumferential lamellæ, few in number, form the internal boundary next to the marrow cavity. They are not to be thought of in the same sense as the outer circumferential lamellæ surrounding the bone, for they are the layers which have been formed around

an enlarged nutrient or marrow space; while the marrow cavity itself is penetrated by very delicate spicules, in fact, the marrow cavity is produced by the spaces of cancellous bone becoming larger and larger until they become one continuous space. Thus, while bone is thought of as a hard and fixed tissue, it is continually being built and rebuilt. It is only

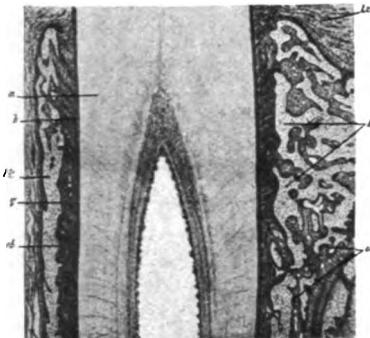


Fig. 1.

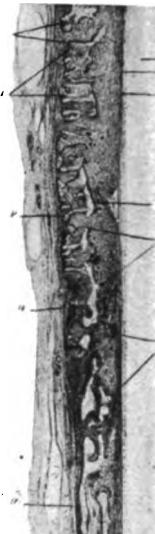


Fig. 2.

by the appreciation of these possibilities that we realize that bone, while a hard and rigid substance, is really a plastic tissue and is continually being modified by mechanical conditions to which it is subjected.*

The alveolar process anatomically consists of an outer and an inner layer of compact bone, and intervening between the two is a mass of cancellous tissue.

The Alveolar Process. The relative quantity of the two forms of bone varies greatly in different individuals and in the different regions of the mouth in the same individual, depending upon the resistance they are called upon to yield. Where greater strain is exerted upon the alveolar process than it is alone able to withstand, those parts are reinforced by buttresses of compact bone for additional support, as in the premolar and molar regions by the malar process and its articulating bones, the malar and zygomata.

*For a more complete description of the processes occurring in the modification of normal bone tissue the reader is referred to the work of F. B. Noyes "Dental Histology and Embryology," Chapters XVIII and XIX, treating on Bone, Bone Formation and Growth.

Histologically, we find these tissues, as previously mentioned, to consist of subperiosteal, Haversian system and cancellous bone. And that each variety depends, as stated above, upon the manner in which the cells and the intercellular substance are arranged. Furthermore, depending upon the mechanical conditions to which these tissues are subjected, the bone cells in these regions as well as elsewhere are ever ready to relinquish their adult form, assume their embryonal type, i. e., they become osteoblasts, and together with the osteoclasts they initiate those processes

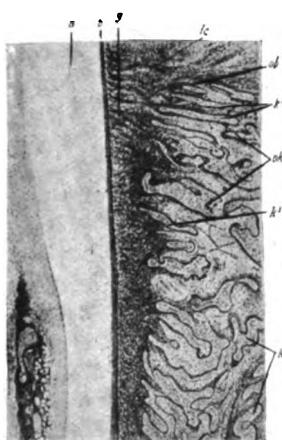


Fig. 3.

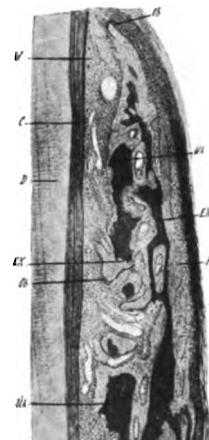


Fig. 4.

that result in the absorption and deposition of bone tissue. Under normal conditions this process may be observed during the period of the shedding of the deciduous dentures and eruption of the permanent series.

MacEwen's Experimental Evidence of Bone Growth.

Moreover, the process of bone transformation may also be set up by artificial means. As has been experimentally demonstrated by Sir William MacEwen (3), of Glasgow, "when stimuli are applied to bone, the cells in the interior proliferate and escape into the Haversian canals and are carried peripherally into the first space suitable for expansion, which is generally the subperiosteal areolar tissue." MacEwen demonstrated that as soon as the bone corpuscles are liberated from their confinement through stimuli, injury or operation, they assume their embryonal type and revert to their vegetative activities, i. e., they feed, grow and reproduce. He further proves that "the osteoblasts once formed have the power of direct and vigorous proliferation, are capable after dissem-

ination of growing in the midst of the soft tissues, of being carried by the blood stream and deposited in blood clot, where they proliferate after the matrix has been supplied with new formed blood vessels. The bone cell has the function of surrounding itself with a calcareous zone, which it controls under the agency of the trophic nerves." As long as the bone cell remains embryonic, it exhibits the power of proliferation; but when it reaches maturity, it assumes the fixed tissue type and becomes stationary, though the *proliferating potentiality still remains*. The extent to which the proliferation may be encouraged depends upon the agent which, while increasing and prolonging this power of the osteoblasts, must not lower its vitality.

Oppenheim's Experimental Evidence of Bone Transformation by Orthodontic Treatment.

In a series of experiments conducted by Dr. Albin Oppenheim (4), of Vienna, these fundamental principles were amply verified. With the aim in view of discovering the nature of the changes in the bone tissues, incident to orthodontic treatment, as well as the changes occurring during retention, Oppenheim utilized several baboons (*cynocephalus*) for his experiments. He adjusted the Angle orthodontic appliances upon their teeth, and after forty days of treatment killed the animals, imbedded and stained the tissues necessary and made microscopic sections for study.

In order to appreciate to what extent bone transformation occurred in these experiments, it will be of advantage to observe first the aspect of a section of a tooth and alveolar process under normal conditions, Fig. 1. Note in particular the arrangement of the bone spicules, constituting the alveolus, they being *parallel* with the long axis of the tooth; and observe the subsequent changes brought about. The first tooth movement performed was that of an incisor in the labial direction. Fig. 2 shows the changes after forty days' application of force. "We find here a complete architectural reconstruction of the labial alveolar wall which in the entire extent of its occlusal two-thirds, consists exclusively of spongy bone spicules arranged perpendicularly to the long axis of the tooth. There is nothing visible of the original lamellar arrangement of the compact bone. The young bone, hardly calcified, very rich in cells, is densely beset with osteoblasts both on the tooth side as well as on the opposite side. The osteoclasts are seen only singly; the processes of deposition have under the influence of continued pressure gained a decided advantage over those of resorption. In the apical third of the root the bone possesses again its normal structure, the lamellæ being arranged in the longitudinal direction of the tooth. It forms again true compact bone." (Oppenheim.)



Fig. 5.



Fig. 6.



Fig. 7.



Fig. 8.

The changes of the lingual alveolar wall are no less remarkable. We find there just as complete and characteristic changes. The architecture of the bone, Fig. 3, has undergone a total reconstruction, and shows a complete deviation from the normal preparation. The characteristic differences are best obtained by a comparison with the architectural construction and arrangement of the spongy bone spicules in the normal preparation, Fig. 1. They consist, as you will see, especially in the gin-



Fig. 9.



Fig. 10.

gival half of the root of the original massive spongy bone spicules, which are mostly arranged in the direction of the pull; i. e., they are transformed into bone spicules arranged perpendicularly to the long axis of the tooth. The extremities of the spicules directed toward the tooth are densely beset with osteoblasts and show uncalcified zones, indicating growth in length and breadth of each spicule. On the extremity pointing away from the tooth we find quite numerous osteoclasts and phenomena of resorption. This proves conclusively that responding to the stimuli of mechanical pressure exerted by orthodontic appliances the bone reacts by a transformation in its structure.

During retention (5), these conditions again undergo some modifications, the bone structure returning to its original form, Fig. 4. That

the bone underwent some transformation can readily be seen when we compare again this view to the normal section, Fig. 1, and observe the uncalcified zones or osteoid tissue still being present.

These experiments prove without doubt that due to the pressure exerted upon the teeth individually by orthodontic appliances, there is a reaction taking place in the substance of the bone, exhibiting histological changes in the structural elements and producing a modification of the architectural arrangement of the bone spiculae adaptive in nature.

Hauptmeyer's Radiographic Evidence of Bone Changes.

The anatomical effect upon the jaw bone as a whole, when pressure is exerted upon the teeth collectively; i. e., upon the dental arches, assumes a different aspect. Thus, when intermaxillary force is employed in the treatment of a Class II or Class III (Angle), the mandible undergoes a change in its form in order to adapt itself to a position in response to the force exerted, restoring the teeth to their normal occlusal relations. In an endeavor to ascertain the character of these changes, Friedrich Hauptmeyer (6), Essen, Germany, undertook the investigation of the problem in the following manner: He prepared radiographs of the jaw bones before treatment, showing the relation of the condyle and coronoid processes of the mandible to the ascending ramus, and the degree of the angle presented by the latter in its relation to the body of the bone. After several months of application of intermaxillary force, another X-ray was taken, and when the treatment was completed, the final radiographic record was made. Thus, Fig. 5 represents a Class II (Angle) case of malocclusion, twelve years old, before treatment; Fig. 6 the same case after about four months of treatment, and Fig. 7 after nine months of treatment. Note the change in position of the condyle and that of the coronoid process. Also note that the sigmoid notch has changed in form and outline. The angle of the jaw has changed in degree and the alveolar process of the mandible seems to have shifted forward, as can be seen by the distance between the last molar tooth and the ramus as well as by the space created between the last two molar teeth.

Fig. 8 represents a Class III case of malocclusion, ten years old. In the treatment of this case force was exerted in the opposite direction. The resultant changes, as may be expected, are therefore in reverse order. As evident in Figs. 9 and 10, the condyle and the coronoid process have migrated in opposite directions, resulting in an inverse change in the outline of the sigmoid notch, the obtuse angle of the jaw has become more acute, and the ramus has also increased in width.

The Author's Clinical Evidence.

I have hitherto endeavored to call your attention to the possibilities of bone transformation in general, to the changes occurring in the alveolar process during individual tooth movement and to the anatomical alterations of the mandible, during collective tooth movement, produced by orthodontic means. In order to appreciate the results obtained by the

Fig. 11.

Fig. 12.

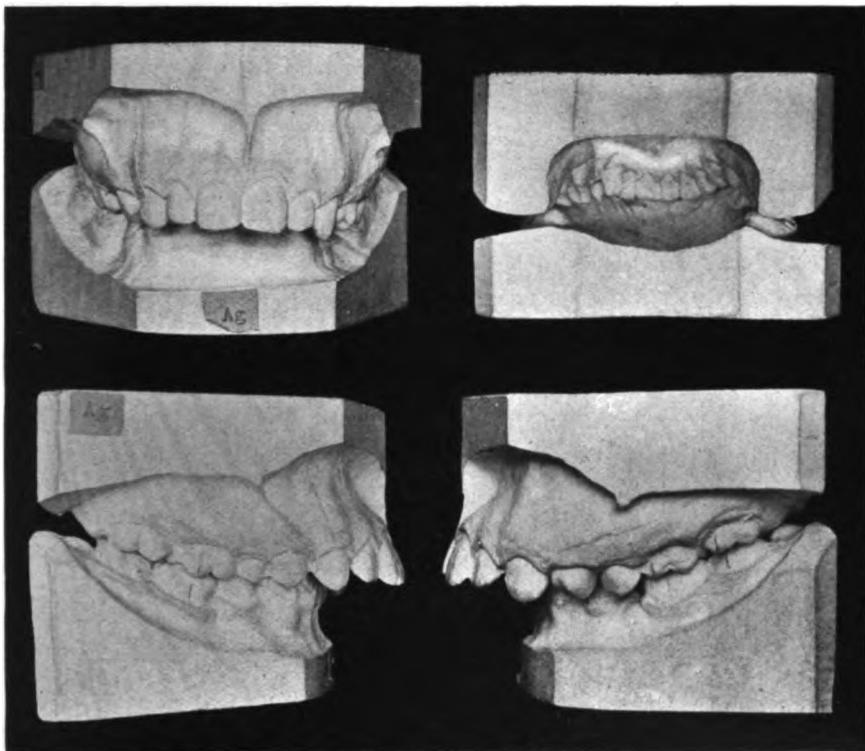


Fig. 13.

Fig. 14.

treatment of three practical cases, I would ask that you bear in mind these important facts, and consider the clinical evidence from such a viewpoint, as will convey the real significance of orthodontic attainments.

Case 1, Figs. 11, 12, 13 and 14, presents a form of malocclusion designated as Class II, Division 1 (Angle classification). The patient, a girl, fifteen years old, in good health, normal weight and height, though rather pale in complexion. The deformity was largely due to a habit of pressing a piece of bread against the anterior part of the palate, holding it there with the tongue and sucking it for many hours at a stretch. The

upper dental arch, Fig. 15, is considerably increased in size, as evidenced by the spaces in the premolar and canine region, and the rotated positions of the former. The lower dental arch, Fig. 17, on the other hand, is greatly reduced in size, due to the absence of both second premolars and their obliterated spaces. The effect of the condition may readily be appreciated when the models in occlusion are again studied, Figs. 11, 12, 13

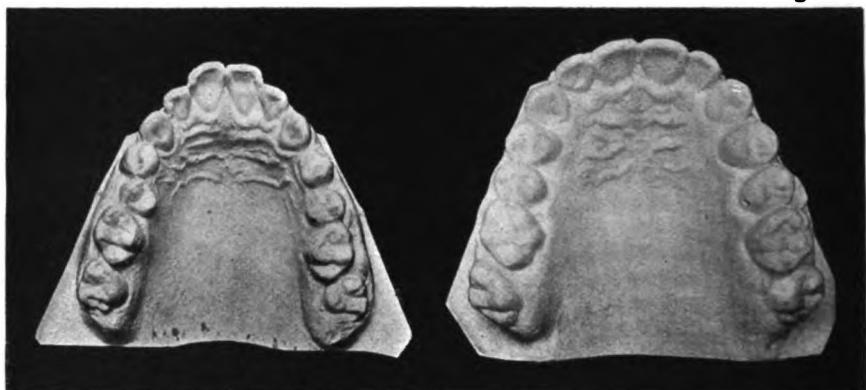


Fig. 15.

Fig. 16.



Fig. 17.

Fig. 18.

and 14. Mastication was defective, since only a part of the masticatory apparatus was performing its function; nasal respiration was interfered with, since the mouth could not be kept normally closed, due to the malrelation of the teeth in the anterior region; speech was affected, due to the disharmony in the sizes of the dental arches, to the decrease in size of the lower arch, limiting the area of activity of the tongue, and to the malrelation of the incisors, many sounds in our speech depending upon the normal position of these teeth; and finally, facial expression was marred. Figs. 19, 20, 21 and 22 show the corrected condition, of which

models were obtained one year after the retaining appliances were removed.

If an examination be now undertaken to discover the extent of modification in the size and form of the dental arches and alveolar processes obtained during treatment, it will be found that though a consider-

Fig. 19.

Fig. 20.

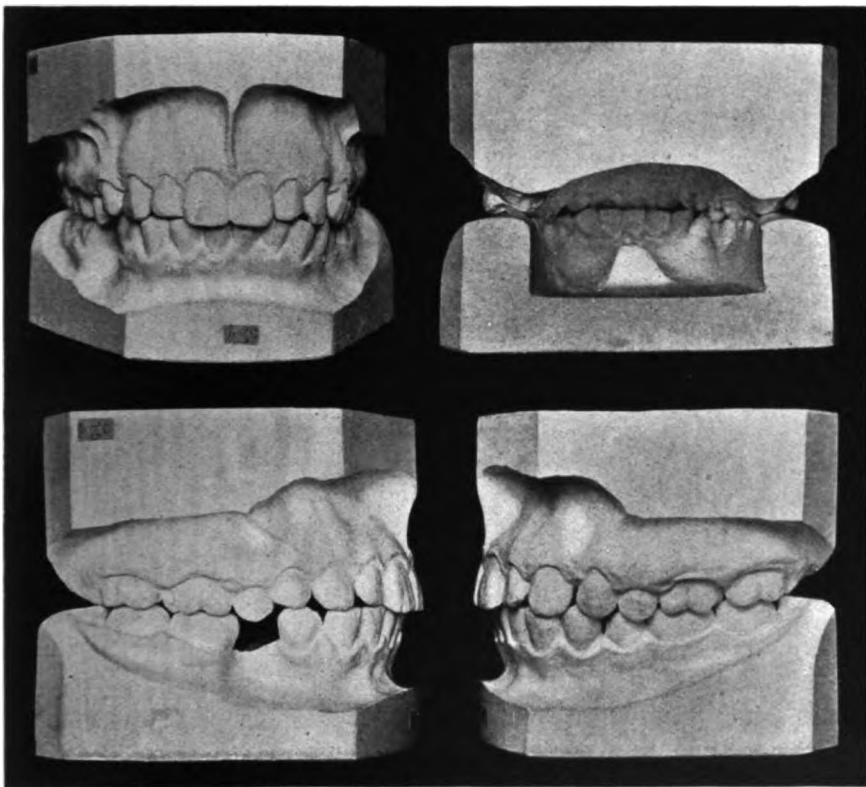


Fig. 31.

Fig. 32.

able transformation occurred in the upper dental arch, Figs. 15 and 16, it is insignificant when compared with the change that has taken place in the lower jaw, Figs. 17 and 18. To convey a clear conception of the character and extent of this modification, accurate measurements were made from certain points and the figures obtained, recorded in Table I. Two series of measurements were tabulated; one series was taken at the lowest linguo-gingival points of the teeth involved, and the other at the disto-incisal angle of the lateral incisors, the cusp points of the canines,

the lingual cusp points of the premolars and the mesio-lingual cusp points of the molars. All measurements were made in millimeters.

If a comparison be made between the figures obtained in the "difference" of the one series of measurements and that of the other, the manner in which the tooth movement occurred will be evident and its in-

Table I.

TRANSVERSE DIMENSIONS

Measurements in Millimeters		At gingival margin			At occlusal points		
From	To	Before	After	Difference	Before	After	Difference
L. I. 2.	R. I. 2.	12.8 mm.	17.1 mm.	4.3 mm.	22.5 mm.	27.9 mm.	4.6 mm.
L. C.	R. C.	18.7 "	20.0 "	2.3 "	25.4 "	29.0 "	3.6 "
L. Pm. 1.	R. Pm. 1.	26.4 "	26.4 "	0.0 "	30.2 "	30.2 "	0.0 "
L. M. 1.	R. M. 1.	32.0 "	34.3 "	2.3 "	33.0 "	34.7 "	1.7 "
L. M. 2.	R. M. 2.	39.5 "	39.4 "	0.1 "	less 40.7 "	40.7 "	0.0 "

MESIO-DISTAL DIMENSIONS

L. M. 1.	R. I. 1.	24.7 mm.	27.2 mm.	2.5 mm.	32.0 mm.	34.7 mm.	2.7 mm.
R. M. 1.	R. I. 1.	25.5 "	28.2 "	2.7 "	30.8 "	34.7 "	3.9 "
L. M. 1.	L. Pm. 1.	10.3 "	15.8 "	5.2 "	9.8 "	15.4 "	5.6 "
R. M. 1.	R. Pm. 1.	10.3 "	16.9 "	6.6 "	7.5 "	16.3 "	8.8 "

NOTE.— L, left; R, right; I, incisor; C, canine; Pm, premolar; M, molar.

fluence upon the alveolar process appreciated. It may also be mentioned here that the eruption of the left, lower second premolar occurred immediately, when sufficient space was obtained; that on the right was found after radiographic examination to be missing. The change in the horizontal plane and the vertical position of the teeth as well as that of the alveolar process may further be seen in Figs. 23, 24, 25, which represents models of the lower dental arch obtained at the beginning of treatment, at an intermediate stage and at the completion of the case.

Case II presents a condition which is diagnosed as Class III (Angle). The patient, a boy, thirteen and a half years old, in apparent good health and normal both in stature and weight, though quite nervous. The character of malocclusion in this case is represented in Figs. 26, 27, 28 and 29. The front view shows the lingual relation of the entire upper dental arch; the right lateral view shows the character of the influence of this

condition upon the alveolar upper processes and the absence of the upper right canine due to impaction, the space of which is entirely closed up; the left lateral view shows similar characteristics as the right, and also shows the delayed eruption of the lower left premolars; the rear view illustrates the extent of the malrelation of the anterior teeth as viewed from within. The disturbance brought about by this condition in the functions of mastication, respiration and speech were considerably more



Fig. 22.

Fig. 24.

Fig. 25

aggravated than in the previous case, and facial expression was extremely marred.

In this case, unlike the one previously described, it was the upper dental arch that presented an extremely under-developed condition, and which, during treatment, underwent the greatest amount of modification. As seen in Figs. 30 and 31, the occlusal views of the upper dental arches before and after treatment, the increase in size occurred both in the lateral and antero-posterior dimensions, and the change in form involved not only the dental arch and alveolar process, but also the palate. These remarkable changes may further be emphasized by the figures obtained from the measurements recorded in Table II. These measurements were obtained in a similar manner as those tabulated in the case above, excepting those of the lateral incisors, which were taken at the mesio-incisal angle.

A close study of these figures will reveal the fact that although the movement of the teeth has been extreme, yet they have been so performed that the longitudinal axes of the teeth have not been unfavorably placed in their relation to the horizontal occlusal plane of the dental arch. Figs. 32, 33 and 34 show the case after completion, models of which were obtained one year after the retaining appliances were removed.

Case III, Figs. 35 and 36, presents a condition which is of keen interest from a different aspect. It is a case belonging to Class I (Angle). The patient, a young girl, fourteen years of age, suffering extremely from defective nasal breathing, and its allied disturbances, colds, etc. This

Fig. 26.

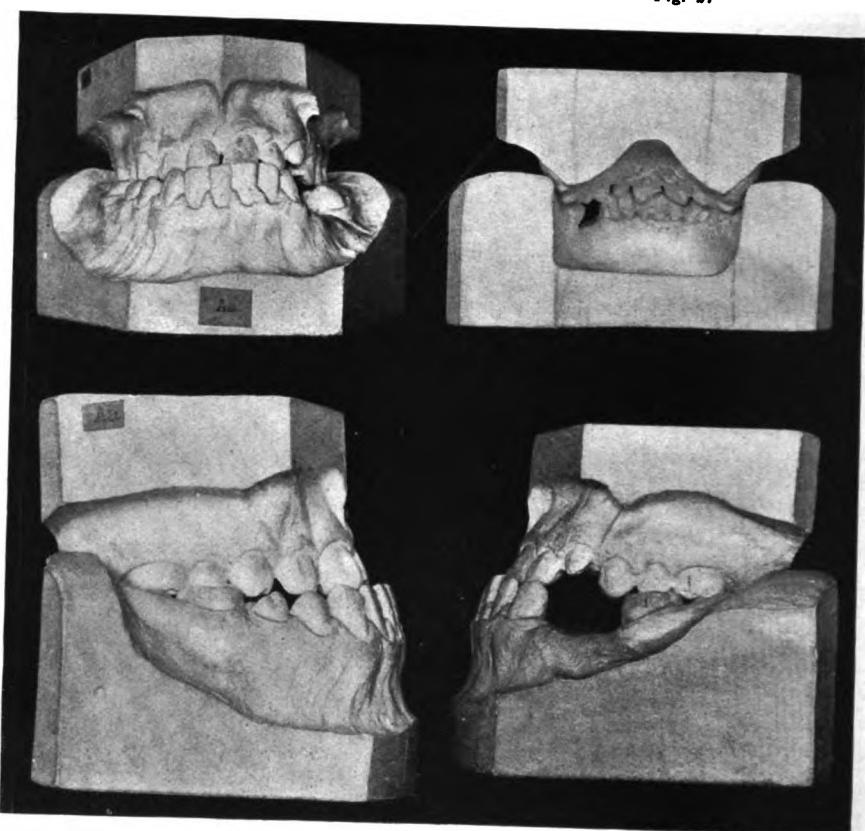


Fig. 27

Fig. 28.

Fig. 29.



Fig. 30.

Fig. 31.

form of malocclusion probably due to excessive adenoid vegetation in the naso-pharynx, and the consequent habitual mouth breathing, consists of a lack in the transverse development of the upper dental arch and the influence of this upon the formation of the palate. As the interesting

Table II.

TRANSVERSE DIMENSIONS

Measurements in Millimeters		At gingival margin			At occlusal points		
From	To	Before	After	Difference	Before	After	Difference
L. I. 2.	R. I. 2.	17.2 mm.	19.0 mm.	1.8 mm.	20.5 mm.	20.0 mm.	0.5 mm. less
L. Pm. 1.	R. Pm. 1.	21.9 "	27.1 "	5.2 "	27.2 "	32.8 "	5.6 "
L. Pm. 2.	R. Pm. 2.	27.5 "	33.1 "	5.6 "	32.7 "	37.5 "	4.8 "
L. M. 1.	R. M. 1.	29.5 "	34.8 "	5.3 "	37.5 "	39.0 "	1.5 "

MESIO-DISTAL DIMENSIONS

L. M. 1.	L. I. 1.	27.8 mm.	31.0 mm.	3.2 mm.	39.0 mm.	39.2 mm.	0.2 mm.
R. M. 1.	L. I. 1.	20.0 "	28.2 "	8.2 "	34.0 "	37.0 "	3.2 "
R. Pm. 1.	R. I. 2.	5.5 "	11.0 "	5.5 "	10.6 "	11.1 "	0.5 "

feature in this case is centered mainly upon the upper dental arch with its alveolar process and the palate, measurements were obtained (see Table III) to ascertain the extent of the lateral increase in the size of the former, and sections made of impressions of the palate to discover the nature of the effect produced by the treatment.

Thus, while these figures reveal the enormous extent to which tooth movement occurred, it conveys no idea as to the effect this treatment had upon the real disturbance; i. e., the relief of mouth breathing. While the removal of the adenoids by the rhinologist cleared the nasal passages of obstructions, the passages themselves were extremely constructed, as may be seen by the formation of the palate, Fig. 37. In order, therefore, to demonstrate the effect of orthodontic treatment upon the form of the palate, impressions were taken of the models obtained before treatment, Fig. 37, and of those after treatment, Fig. 38. Cross sections were then prepared as indicated in the figure and diagrams made by tracings of those sections. The comparative tracings were then accurately

measured and the figures obtained indicated in Fig. 39. The last column in the illustration represents a composite diagram of the sections before and after treatment.

Reiterating the remarks made in the discussion of our topic, the

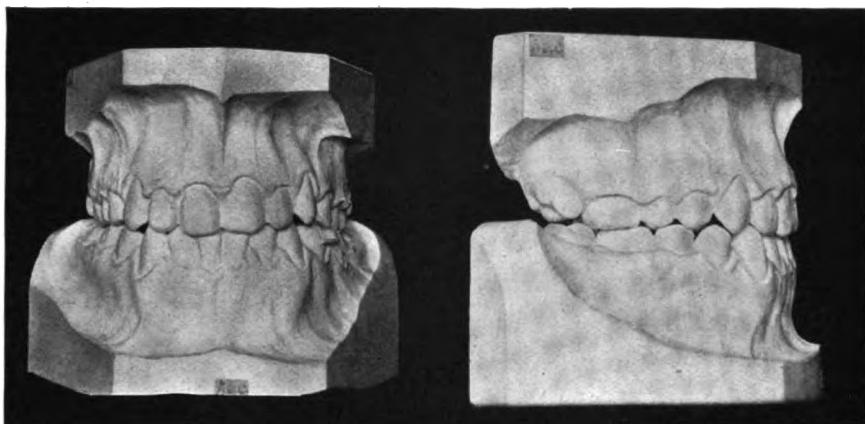


Fig. 32.

Fig. 33

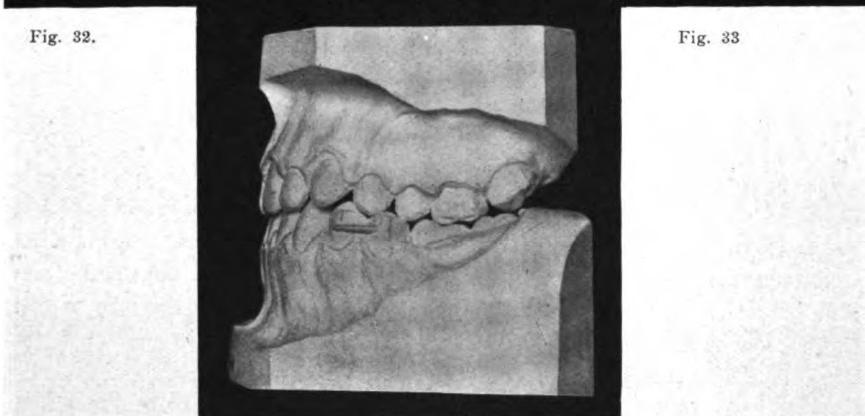


Fig. 34

main contentions may be gathered into the following focal points:

1. That, while one of the chief characteristics of lower animals and plants is to respond to their natural environment in such a way as to insure their continued existence, in higher animals, these characteristics are manifested by certain tissues specialized for the purpose.

2. That some of the tissues organized to adapt the higher animals to the mechanical conditions in their immediate environment are those designated as *connective tissues*.

3. That bone is that form of connective tissue in which its intercellular substance is calcified and arranged in layers around nutrient canals or spaces. And that bone, while a hard and rigid substance, is

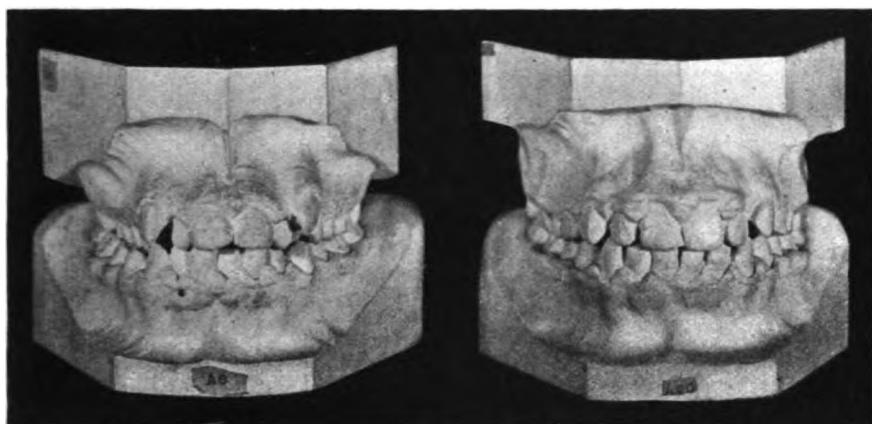


Fig. 35.

Fig. 36.

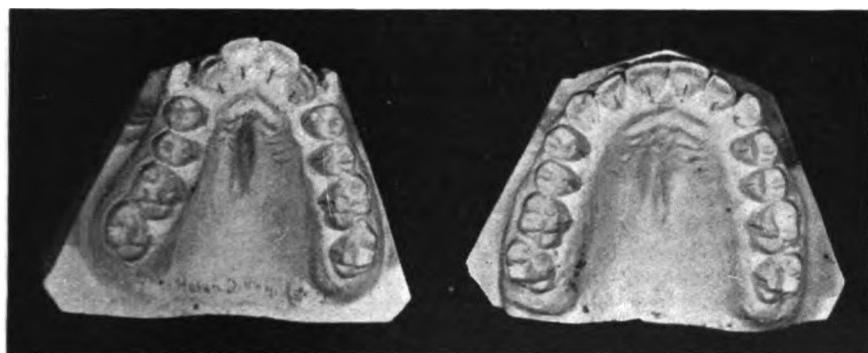


Fig. 37.

Fig. 38.

really a plastic tissue and is continually being modified by the mechanical conditions to which it is subjected.

4. That the alveolar processes and their adjacent bony structures, being constituted of the same structural elements as bone tissue in general, are governed by the same general laws; i. e., their form is dependent upon the mechanical conditions to which they are subjected.

5. That an artificial alteration of these mechanical conditions will produce a relative change in structure and form of the parts involved.

 Items of Interest

Diagram of cross section at interproximal space of premolar 1 and 2.

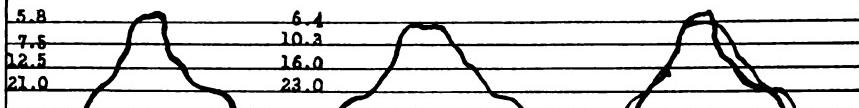


Diagram of cross section at lingual cusp point of premolar 2.



Diagram of cross section at interproximal space of premolar 2 and molar 1.



Diagram of cross section at lingual groove of molar 1



Diagram of cross section at lingual groove of molar 2.



Fig. 39.



This modification will persist when adaptive in character; i. e., when it is of advantage to the existence of the individual, and when the conditions that brought it about persist or are substituted by function.

6. That, as malocclusion of the teeth has been recognized to be due to malformations in the jaw bone, the teeth themselves being but diagnostic landmarks, the corrective measures are based upon mechanical stimulation of the tissues involved, and applied in such a manner as to alter the bones in their form, size and position, so as to be in harmony with the other related parts.

Table III.

TRANSVERSE DIMENSIONS

Measurements in Millimeters		At gingival margin			At occlusal points		
From	To	Before	After	Difference	Before	After	Difference
L. I. 2.	R. I. 2.	12.7 mm.	17.8 mm.	5.1 mm.	19.7 mm.	28.5 mm.	8.8 mm.
L. C.	R. C.	27.5 "	28.0 "	0.5 "	32.7 "	36.5 "	3.7 "
L. Pm. 1.	R. Pm. 1.	20.0 "	29.0 "	9.0 "	23.1 "	35.0 "	11.9 "
L. Pm. 2.	R. Pm. 2.	23.0 "	33.9 "	10.9 "	27.8 "	38.4 "	10.6 "
L. M. 1.	R. M. 1.	23.0 "	35.8 "	12.8 "	34.4 "	44.2 "	9.8 "
L. M. 2.	R. M. 2.	36.5 "	38.9 "	2.4 "	42.1 "	46.4 "	4.3 "

And finally, as it has been shown, modern orthodontia, aiming at the restoration of the function of mastication, and that of respiration, the correction of defective speech and the esthetic improvement of facial expression establishes by its therapeutic means such mechanical conditions that result in morphologic changes of the parts involved.

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Discussion of Dr. Hellman's Paper.

When I first received a copy of Dr. Hellman's **Dr. Charles H. Spahn.** paper, the discussion of it appeared to be a most difficult matter. I have read it carefully and it is impossible to find any point with which I could disagree.

Dr. Hellman has credited in his paper the authors from whom he has quoted, and I may say that the works of Dr. Oppenheim and Dr. Noyes have been very profitable to me, and in my last paper before the Tri-County Dental Society, and also at the meeting of the Academy of Medicine in Newark, I tried to make clear the changes taking place in the bone during tooth movements. I drew many of my deductions from the work of Murphy, MacEwen, Davenport and Albray. Anyone interested in this particular subject will know of their work, and their ideas regarding the stimulation of bone growth. Dr. Albray has grown bone in the spinal column through certain stimuli to which he has subjected the bone. The peculiarity of our particular branch is that we have a tooth surrounded with bone, with a cushion between, in which to create the stimulation in a very mild yet sufficient way, which is something we do not find in any other part of the body.

It is difficult for me to decide which theory is correct. I know that Murphy, of Chicago, has an entirely different theory from that of MacEwen and Davenport, and Albray disagrees with the other three, while I adhere strictly to the teachings of Noyes and Oppenheim because I believe that, being specialists in this particular branch, they certainly are in a better position to judge which is correct. Nevertheless, the fact that many of these experiments have been carried on in the mouths of primates, makes us unable to say whether the same conditions or growths take place in the human beings as in the primates.

Was it a baboon that these experiments were carried on with, Doctor?

Dr. Hellman.

Yes.

I take it for granted the changes would be the

Dr. Spahn. same, still we might find something quite different in the bones of the human being—say that of a child

ten years of age—from what we find in the bone of the primate under experiment. It is impossible to take sections of human bone, while under treatment, unless we might get it right after death from accident or something of that kind, which would probably be very valuable.

The question of growing bone is not very well understood by the dental profession or the medical profession either, for only a few days ago I heard a physician testify that bone could not be enlarged or grown after it is once ossified.



The impatience of the orthodontist to obtain results is his greatest obstacle, because (as Dr. Hellman has pointed out to-night) the spiculae which grow in the direction of the pull should be made to grow very slowly. However, we find some patients can permit a great deal faster movement than others, but at the same time, to be on our guard and to be on the safe side, as Dr. Hellman has pointed out to us, the bone spiculae in elongating should be made to elongate slowly.

The slides shown to-night were very impressive, and if we could see them with the eyes and knowledge of Dr. Hellman we might be benefited a great deal more.

Dr. Hellman shows that orthodontic work is not only the straightening of the teeth, but the changing of the entire individual to some extent. I am sorry Dr. Hellman has not presented photographs of his patients, for I am sure they would be of a great deal of benefit. In those pictures we could see what a wonderful change has taken place in the face of the patient under Dr. Hellman's care—how a mouth breather has been changed to a normal breather; how the nasal spaces have been diverted and the entire facial expression changed from abnormality to beauty. In addition to that, the entire physical condition of the patient is improved. Not only have the jaws and the soft tissues been changed and improved, but two-thirds of the patient's head has been improved, and the benefit cannot be overestimated.

Dr. Hellman has shown an effect which cannot be disputed; we can only give him credit and thank him for the work he has done in orthodontia, not only at this particular meeting, but in other highly scientific papers we have had the pleasure of reading in the magazines.

Dr. Stevens. The great array of facts brought out by the essayist this evening shows the great necessity for good dentistry or the normal occlusion of every filling inserted by the practitioner.

As he has pointed out, in order to have a normal and healthy growth of the maxillary bones they must be subjected to normal strain in all directions. This, in my opinion, means that we must discard the time-honored flat amalgam filling and substitute gold inlays, properly carved in the wax pattern.

It may be urged that the cost of the inlay is too great and that many patients cannot afford to have the best possible work we can supply. It is, I believe, all a matter of education; what we must do to best serve the public is to teach them the prime importance of good dentistry. Once a layman appreciates the importance of proper occlusion he will find a way to afford to pay for it.

Proper occlusion means, more than any other factor, a clean mouth and healthy oral mucous membrane, good mastication, good digestion and proper assimilation.

In conclusion I would say that the study of orthodontia by the ordinary practitioner, regardless of whether or not he intends to practice it as a specialty, will do more to promote progress in the art of dentistry than any other branch of study we can pursue.

Were it not for men like Dr. Hellman and others

Dr. Taylor. who have spent much time in investigation and research in this department, tabulating their findings and giving them to us, we would be very much in the dark as to what we could do and as to what we ought to expect.

There is one point that seems to me to be proof absolutely of the fact that we can develop bone and bring about the changes we desire in the position of the teeth in orthodontic work. For example, I am about finishing a very bad case of infra-occlusion, and I was at one time very much disturbed because I thought I might draw the teeth entirely out of their sockets. I went down to consult Dr. Waldron, as I do when I get in trouble, and we talked the matter over. I then applied what I considered the right degree of pressure on the six anterior teeth in either jaw, and that gentle pressure has been on now for nearly a year, and the infra-occlusion has been entirely corrected and the bite is normal in front. I measured those teeth from the cutting edge of the teeth to the cervical margin of the gum, and I found there is not a millimeter of elongation of those teeth from their sockets. Therefore, I must have brought down the process of the upper jaw and brought up the process in the lower jaw, and they have followed the teeth, and the bone has developed and grown. I speak of that because in such cases we sometimes feel there is danger of the teeth being extruded, but if the pressure is not too strong and is applied in the right way, and the case well watched, we need not fear.

I had hoped that Dr. Hellman would speak more particularly of assisting teeth in eruption, so that we might realize that there is actual development caused by the stimulation that occurs when any of the adjoining roots are moved in the bone.

The paper presented to you to-night by Dr.

**Dr. Wilbur Daly,
New York.** Hellman contains points of great interest. What I want to call particular attention to is the fact that he laid great stress on defective bone. It is true that from lack of bone growth we have irregular or maloccluding teeth; where we have the normal growth of bone in the human being we find the normal dental growth as required by nature.



There are many features presented in the paper to-night, concerning which issues could be raised, but the feature I would like to call particular attention to is that of the ages of the patients, work upon whom has been shown. The question is, when will we get normal growth of bone in those cases? Many years ago, when I was correcting cases at the age of from twelve to twenty, I found I did not get as good results as I do now, the reason being that I found that much longer time was required for retention. The period of active bone growth had passed, and therefore the bone was not of so dense or solid a nature as during the formative or growing bone period. With that in view I have advocated for many years the early treatment of malocclusion.

I fully agree with Dr. Daly as to the bone growth in the maxillary region during the period he mentioned, but growth really never stops up to about the eighteenth year. There is, however, always a decrease in the rate of growth, and with stimulation we can aid it considerably, as is shown in the cases he mentioned.

Dr. Taylor said he did not know how to get hold of an erupting tooth. There is not always a necessity for that. Give a tooth a chance, give it its proper space, and it will usually take its position in the arch. In the cases shown the unerupted teeth were not touched; all that was necessary was to make room for them. Sometimes you may lose patience and think they never will come into position, but just wait and they will erupt.

I am very happy to have met such an interested audience, and it has given me a great deal of pleasure to be with you.





A Case of Severe Hemorrhage after Extraction.

By DR. F. N. BEAM, Buffalo Center, Iowa.

On September 17th last, Mr. T. K. Single, laborer, born in Denmark twenty-eight years ago, came into my office to consult me as to what he could have done to his teeth. Upon examination I found that he was wearing a partial upper plate carrying the right central and lateral and one or two bicuspids. His molars and the left central and lateral were decayed to the gum, and had been in that condition for years so that but parts of the roots remained. The lower teeth were in about the same condition, those of the incisors remaining showing decay and the roots of the molars decayed to the bifurcation of the roots. Taking everything into consideration, I advised him to have all roots and teeth extracted, and full upper and lower dentures made. He agreed to this, but stated that when he was twelve years old he had had a tooth removed and that the socket had bled for three weeks. He said that had discouraged him from having any more extracted, but that probably he was in better physical condition now, and could have it done without difficulty. This was as much as I knew of the case when I extracted the roots, and the trouble he had had previously I attributed to the rupture of a small artery, which had been held open by a fracture of the process around the socket.

I made an appointment with him to come back that afternoon at two o'clock, which he did, when I extracted one root of the first molar on the right side, and waited for bleeding to stop, which occurred as promptly as usual. I then proceeded to remove the roots of the molars on each side of the upper jaw, waiting after each operation to see if there were to be any complications, but all bleeding ceased in less than five minutes.

Exodontia

Hemorrhage Several Hours after Extraction.

I then suggested that we remove no more till a later date, to which he agreed and he left the office, feeling as though he was to have no further trouble in having teeth extracted. I thought so, too, but the next morning, about ten, he came in the office and reported that at about nine P. M., some six or seven hours after the teeth were removed, bleeding began on both sides; that he tried to stop it by such means as he knew, but bleeding became more profuse right along till midnight, when he came to town and called up Dr. G. F. Dolmage, M.D., who checked it readily by packing with adrenalin tape. He went to his room in town, and went to bed, and was awakened about seven A. M. by his mouth filling up with blood. He tried to get Dr. Dolmage again, but could not and then came to me.

Adrenalin Chloride.

I stopped the bleeding in about ten minutes with adrenalin chloride and cotton, and advised him to go back to his room and to bed. He left the office and was back in about thirty minutes, bleeding as freely as ever; said that when he stooped to pull off his shoes it started in again. It again yielded to the cotton saturated with adrenalin chloride packed in the sockets, and I told him to get one of his men to stay with him and to go to bed, and not to exert himself in any way. This he did, but in a few hours was bleeding again. We had him lie in a semi-recumbent position, with his head in an ice pack.

Calcium Chloride Potassium Iodine and Thyroid Gland.

We used all of the common styptics known, locally, and were giving internally calcium chloride 8o-G, potassium iodide 3o-G, and thyroid gland 15-G. each, daily, but we could control the hemorrhage for only a few hours at a time, when one side or the other or both would bleed as freely as ever.

Diphtheria Serum.

We saw that we were not making any progress with that treatment, and on September 20th Dr. Dolmage administered diphtheria serum subcutaneously, without effect. On September 22d he was very weak from loss of blood, although the sockets were kept packed continuously with gauze saturated in adrenalin chloride. On this date Dr. Dolmage took his blood count, which was: Red 2110140, white 3600, haemoglobin 20 per cent. His blood after standing one hour and one-half formed only a soft clot, the case was becoming more serious and Dr. Dolmage and I were giving it most of our time and study. We had tried every method known to both of us without any permanent result.

**Actual
Cautery.**

We then decided to use the actual cautery and under ether anesthesia we practically cauterized the sockets to a cinder before we could stop the bleeding. Finally we succeeded in doing so, not a drop of blood

was showing and we thought that now we had it under control. He did not bleed any more until the eschar sloughed away from the tissues some forty-eight hours later, when bleeding began from the gum tissues surrounding the sockets. It was quite profuse and while I finally succeeded in stopping it on the right side with trichloracetic acid cauterization, the same remedy would not stop it on the left side. There was no further bleeding from the sockets and at this time only from the gum tissue on the right side, but blood simply oozed through the tissues surrounding the sockets where the roots had been extracted and *slightly from around the central and lateral roots which had not been touched at all.* On September 28th Dr. Dolmage gave him 120 C.Cs. of diphtheria antitoxin, this time intravenously, with little reaction and no effect upon the hemorrhage.

On September 30th the patient was so weak from continuous loss of blood that he was unable to walk, his appearance was anemic in the extreme and he was losing his appetite which, up to this date, had been good and had helped to keep up his strength.

Horse Blood Serum. Dr. Dolmage then decided to try the virtues of pure fresh horse serum which, he stated, had been used successfully within the last year or two by some surgeon, to increase the power of the blood to clot.

With the assistance of Dr. Kertz, D.V.S., a sound young three-year-old horse was selected, from which they extracted a quart of blood. It was then defribinated and centrifuged and put on ice for twenty-four hours and on October 2d 120-C.Cs. of this serum was injected *intravenously* through the median basilic vein. The patient suffered much shock during the latter part of the injection. Hemorrhage stopped inside of five hours; temp. at that time was 101, pulse 120, resp. 22. Patient developed a severe urticaria over entire body twelve hours after injecting the serum; for fear of further hemorrhage 30-C.Cs. of the same serum was given in the same manner forty-eight hours after the first injection. Patient was kept in bed for one week longer, when he had regained sufficient strength to resume his work.

As all of the previous treatments we had used had failed we are forced to believe that the pure fresh horse serum was the remedy that stopped the hemorrhage and saved this patient's life.

Family and Medical History of Patient. The case being so unusual Dr. Dolmage secured the social, family and past medical history of this man, which I will record, as it shows that he is from a line of bleeders and has inherited his haemophilia.



Social History: No alcoholic nor venereal history.

Family History: Father and mother alive and well, aged 66 and 62 respectively; two brothers, aged 34 and 35, alive and well. Two sisters, 29 and 31, alive and well; *no other bleeders in immediate family*.

Mother's brother died at age of twelve from hemorrhage from slight cut on face. One of mother's male cousins a bleeder. Mother's father a bleeder; several of the males on mother's side were bleeders several generations back.

Past medical history: Had had measles and mumps; severe hemorrhage at age of twelve, following extraction of one tooth; had been troubled with nose bleed during entire life.

The use of the actual cautery caused a sequestrum to form on the right side which sloughed out on or about October 24th; that is, it became loosened and he removed it himself without any hemorrhage at all; it was about one inch long and of varying thickness from about 2 m.m. to a feather edge. On October 26th he again came to my office suffering with an abscess on the only bicuspid he had left in the upper jaw; it was very loose and I was sorely tempted to extract it for two reasons, first to give him relief and secondly to see if the effects of the serum administered was still operative in aiding his blood to clot, but as I was able to establish drainage in the tooth which relieved his pain, I thought that it would not be wise to risk extraction.

Dr. Dolmage deserves all praise and credit for the successful treatment of this case, and as I was in such close touch with the case throughout, I give it publicity through ITEMS OF INTEREST, thinking that the treatment used might at some time, somewhere, be of use in cases of this kind, which are rare, fortunately for the dentists.

"Fright."

By DR. P. S. COLEMAN, Wilburton, Oklahoma.

I am located in a section of the country which is largely populated by foreigners, Polanders and Italians. As a rule they very rarely undertake any extensive dental operations and extraction of offending molars is invariably resorted to. Practicing among them for some years I have naturally become acquainted with their present modes of living and have learned quite a deal of their history in the old country, where the men, being subject to army restrictions, have had some weird experiences at the hands of Italian army surgeons.

It appears that when one becomes afflicted with "toothache" he selects

several "holders" and presents himself for an extraction. As a natural result of this kind of proceeding it is very rarely that an Italian presents himself at my office in a natural frame of mind; he comes as a last resort.

Usually the newcomers are anemic, of weak constitution and very susceptible to the effects of cocaine. Fright, however, seems to be the main affliction. I recall one case in particular.

Some eighteen months ago a young Italian called for an extraction. Immediately after the injection of a one per cent. cocaine solution he developed alarming symptoms, finally becoming unconscious, in which condition he remained for nearly an hour, responding very feebly to hypodermic injections of strychnine and nitro-glycerine. While in this condition I extracted the tooth. Probably a year later he presented again. This time I used a solution of two per cent. novocain and the results were identical. I settled down to an hour's work reviving him, which was even more difficult than on the previous occasion, and at times the pulse and respiration were almost nil, death seeming very imminent. Previous to this extraction I had administered a large dose of alcohol. Three months ago, he again called for me to remove a small root which was very loose, and not especially painful. I had in mind the previous experiences which were not at all pleasant, and simply taking a piece of cotton saturated with iodine and aconite, rubbed the gum and removed the root. The patient seemed to experience no pain whatever and, as a matter of fact, all of the extractions were of the simplest nature, but he promptly fainted, and again with the most alarming symptoms. This time it was necessary for me to resort to hypodermics, artificial respiration and oxygen to effect a recovery at the expiration of two hours.

In this case my diagnosis is nothing more nor less than "fright" pure and simple. A close examination developed no heart trouble. In the use of cocaine I have very seldom experienced trouble in extractions when pus is not present. In the use of conductive anesthesia of the lower jaw for the purpose of extraction I find one-third to two-thirds of one per cent. cocaine solution effective and two per cent. novocain about upon a par. From the cocaine solution, toxic effects have been noted in the ratio of about three per one hundred and the novocain toxic effects are practically nil. In most cases of intoxication, I find fear is responsible and is present in almost every case, and our efforts should be directed along the line of imparting confidence to the patient. Tell him you are not going to hurt and then keep your word.



Reflex Anesthesia.

By WILLIAM H. FITZGERALD, M.D., Hartford, Conn.
Read before the New Jersey State Dental Society, July, 1914.

In this paper I have attempted to condense my illustrated talks before the Connecticut and New Jersey State Dental Associations and shall only discuss that part of the subject that will most interest the dentist.

In zonotherapy we divide the body longitudinally into ten zones, five on each side and including the median line. The first, second, third, fourth and fifth zones begin in the toes and end in the thumbs and fingers or vice versa. The first zone extends from the great toe up the entire height of the body from front to back, across chest and back (Figs. 2 and 3) and down the arm into the thumb or vice versa. Pain in any part of the first zone may be treated and overcome temporarily, at least (and often permanently), by pressure over the first joint of great toe, or corresponding joint of the thumb. Should the pressure be limited to the upper surface of the great toe the anesthetic or analgesic effect will extend up the front of the body to fronto-parietal suture; also across chest and down the anterior surface of the first zone of arm and thumb and often the thumb side of index finger. (Fig. 2.) Should pressure be made on the under surface of the great toe the effect will extend along the first zone in the sole of the foot and up the back of leg, thigh, body and head in that zone to the above named suture; also across the back and down the posterior surface of the first zone of the arm and thumb, and often the thumb side of index finger. (Fig. 3.) Pressure on the end of the great toe or tip of the thumb will anesthetize the entire first zone. A limited amount of anesthesia may be established by pressure over any

resistant bony surface in this zone, and often the mere momentary contact with the galvano-cautery will produce the same result. Pain anywhere in this zone may be overcome more quickly by pressure with applicator or with cautery contacts at certain points throughout the first zone in the mouth, pharynx, epi-pharynx and nose, but the finger and toe pressures may be relied upon very often and what applies to one zone, applies to all. Pressures average from one-half minute to four minutes depending upon the susceptibility of the patient. If for example your patient has pain in the first zone on the left side of the jaw (upper

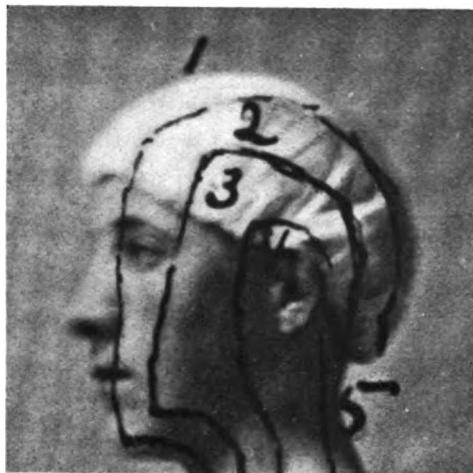


Fig. 1.

or lower) it is overcome, temporarily, at least, by firm pressure on the great toe or thumb. The patient may exert this pressure himself, but the operator or an assistant will do it more expeditiously. This pressure may have anesthetized the incisor region sufficiently for painless extraction of the incisor and cuspid teeth (left). However, it is usually necessary to supplement this pressure, for operative interference, by pressures on the lips and at various points on the jaws. The first, thumb or great toe, zone (left for instance) usually includes the left incisors and cuspid tooth. Occasionally the second zone includes the cuspid tooth. The second zone, as a rule, includes but the bicuspids teeth. The third zone includes the two molars and the inner side of the fourth zone, the wisdom tooth. Pressure with the thumb or index finger or cautery contacts on the upper or lower jaws in any of these zones will relieve pain in any part of an individual zone. Pressure or cautery contacts on the



Fig. 2.

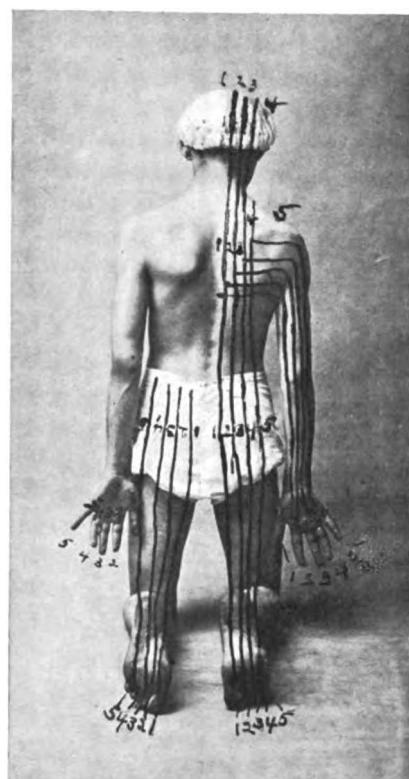


Fig. 3.

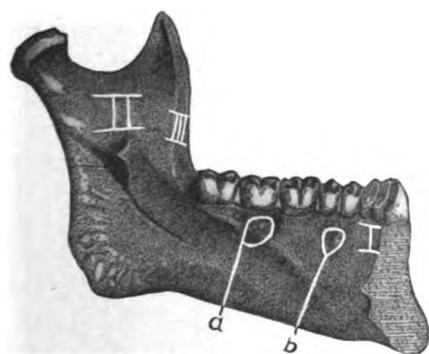


Fig. 4.

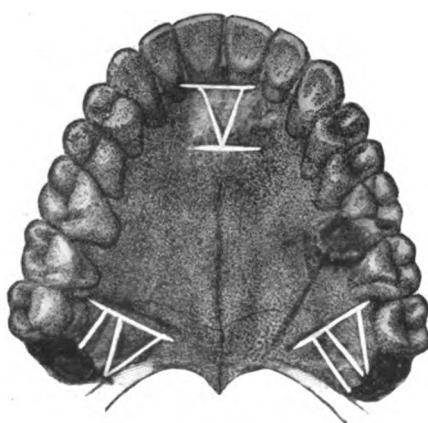


Fig. 5.

anterior surface of jaws, control anterior sections of zones one, two, three, and four, and pressures or cautery contacts on the posterior surface of jaws control posterior sections of the above zones. Pressure with the thumb or finger on the inferior dental and lingual nerves at the inferior dental foramen will anesthetize that half of the jaw, and to a greater or less extent the entire half of the body on the side compressed, and because of the anastomosis of nerves at the median line of the jaw, this pressure occasionally causes an anesthesia of a part or even the whole of the opposite side of jaw, but this is the only instance thus far noticed where anesthesia, through pressure, crosses the median line of the head or body.

**Theory of
Zonatherapy.**

We are repeatedly called upon for the theory of zonotherapy. Most theories are interesting, but not conclusive, and rather than be obliged to retract theories we will not attempt to advance them (except very superficially) at the expense of clinical facts, at least, not in this paper. It is possible that certain control centers in the medulla are stimulated, as has been suggested, but I believe that it is shock more often than stimulation. Some theorist has pointed out, perhaps rightly, "these functions may be carried out by the pituitary body through the multiple nerve paths from it."

We know that we induce a state of inhibitive anesthesia in the zone where pressure is brought to bear. We are certain that lymphatic relaxation follows pressure and the theory advanced by Dr. Bowers, "that inasmuch as there are admittedly ultra-microscopic bacteria, it is more than likely that in the light of this work there are ultra-microscopic connections analogous to those we call nerves."

Let the physician or the dentist who ascribes these phenomena to suggestion, attempt to relieve an aching incisor (left) by pressing the little finger of the left hand of his patient, for instance, or exercise his persuasive powers on a throbbing molar by pressing the thumb. He will find himself up against a stone wall so far as results are concerned, for only by exerting pressure on the proper zone will the pain disappear. Anticipating such contentions, we have purposely refrained, in hundreds of instances, from suggesting that we were even contemplating the relief of pain, and the first and only suggestions have been from the patient, for example: "Doctor, I certainly experienced much pain in the jaw, eye, small of back, knee, foot or shoulder, etc., before you pressed my fingers or used pressure in my mouth, but where has the pain gone? Have you done anything to relieve it?" etc., etc.

What concerns and interests you most, as dentists, is the possibility

of demonstrating on practically everyone of your patients the connection between the toes and fingers and the teeth. This establishes the incontrovertible fact that the medical and dental fraternities must work together if we are to accomplish all that it is possible to accomplish in combating disease, for it clearly demonstrates that foci of infection, however minute in the mouth, may be responsible for pathological changes



Fig. 6.



Fig. 7.

in practically every section of the body. Pathological conditions from mere irritation in the nose, epi-pharynx, pharynx, mouth, throat, vagina, rectum, etc., may be responsible for not only annoying local manifestation but obscure pathological changes in most remote sections of the body and their course can usually be traced through an individual zone. There is not an existing pathology condition that cannot, at least be relieved, and a large proportion can be cured through what we may some day call "shock anesthesia." We have never suggested this work as a panacea, but finding it helpful in the treatment of human ills we consider it an asset to our knowledge of medicine and surgery, and have been glad to offer it gratuitously to physicians and dentists to make whatever use they will of it in the practice of their professions.

Some Effects of which We Are Certain in Zonatherapy.

First: Analgesia may be produced in the majority of cases over all parts of the body, from pressures or cautery contacts in the mouth, pharynx, epi-pharynx and nose, and analgesia in a large percentage of cases over the entire body from pressure or cautery contacts on extremities.



Fig. 8.

Second: Anesthesia of jaws may be produced in the majority of cases from direct pressure or cautery contacts on the jaws, and anesthesia of the jaws from pressure or contacts on extremities in a fair percentage of cases.

Many dentists have written me stating that they have been suc-

cessful in establishing anesthesia through pressure in at least fifty per cent. of their cases. Patience and perseverance and the observance of a few general instructions will enable them to improve their technique and their success will correspondingly increase.

Those who have not been successful, perhaps because of lack of perseverance, or who have not even attempted to anesthetize through pressure, being influenced and strengthened in their scepticism by in-



Fig. 9.

Fig. 10.

dividuals interested in the sale of apparatus for the administration of anesthetics, or others interested in some proprietary article of anesthetic persuasion, would better get to work and convince themselves that pressure anesthesia has come to stay.

There will be no soreness or lameness of jaws due to this form of anesthesia following operation, if instructions are followed.

Description of Illustrations.

Fig. 1.—Profile with individual zones in head.

Fig. 2.—Anterior view with zones outlined throughout face and extremities, left. Comparatively few patients are able to trace sensations

or pressure throughout body, but on the other hand, pain in any part of the body in a large percentage of our patients seldom resists zona-therapy. These illustrations are approximately correct, but are subject to slight revision.

Fig. 3.—Posterior view illustrating individual zones. It will be ob-

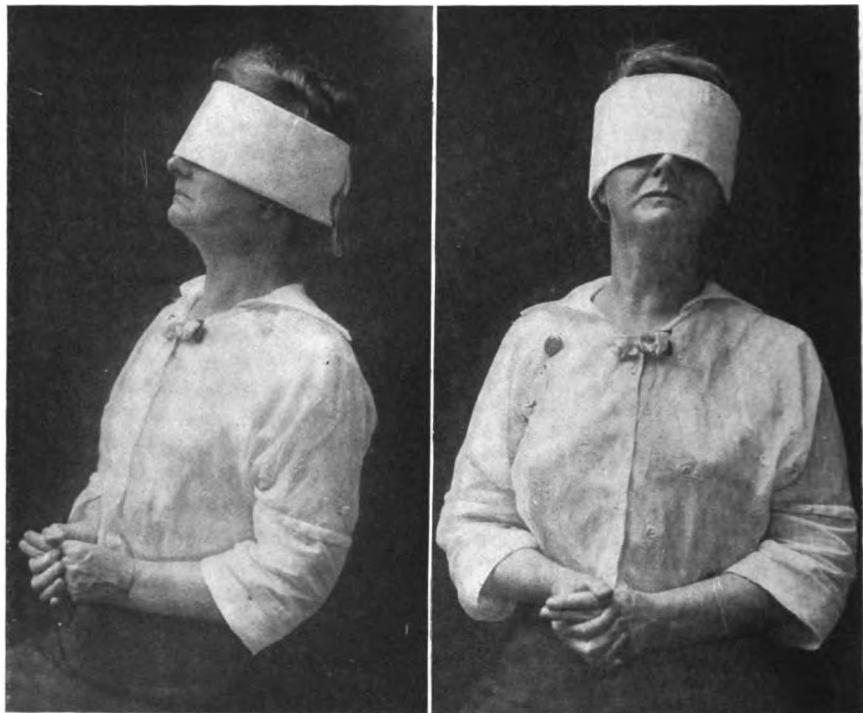


Fig. 11.

Fig. 12.

served that what is commonly called the back of the hand is really the front of that member, whereas the palm of the hand corresponds to the sole of foot.

Fig. 4.—Pressure at I, Fig. 4, with thumb and finger will anesthetize both thumb zones inasmuch as the pressure is brought directly on the median line and to the right and left of it. Pressure at II, Fig. 4 (pressure on inferior dental and lingual nerves) will anesthetize not only the entire jaw on the side compressed, but to a greater or less extent, the entire half of the body. Pressure at (a), Fig. 4, with thumb and finger (anterior and posterior) will often anesthetize that zone sufficiently for painless extraction. Any tooth for extraction may be prepared similarly. Cautery contacts at some points will often accomplish the same results.

that is on anterior and posterior surface and between the teeth. Pressure at (b), Fig. 4, with thumb and finger, anesthetizes bicuspids and occasionally molars. Pressure at III, Fig. 4, with thumb and finger, will aid materially in anesthetization.

Dr. B. A. Sears was the first to note that pressure on the ring finger anesthetized the wisdom tooth, and Dr. Charles H. Riggs, Dr. W. J. Hogan, and Dr. Geo. McLean, of Hartford, and Dr. James A. Lawton,



Fig. 13.

Fig. 14.

of Middletown, Conn., concur with him in this observation and all of the above named dentists say that occasionally they must look to the little finger for assistance in anesthetizing the wisdom teeth.

Fig. 5.—Pressure at IV, Fig. 5, will not only anesthetize the third and fourth zone, but oftentimes that half of upper jaw. Pressure at V, Fig. 5, with finger covering median line and a counter pressure with thumb on outside of jaw, or even on lip directly opposite finger, will usually anesthetize the incisors sufficiently for painless extractions and occasionally the entire jaw.

Fig. 6.—Patient is here anesthetizing the anterior surface of the jaws (left) in first zone, by firmly pressing the lip directly opposite, between



thumb and index finger of left hand, and indicating the area with right index finger.

Fig. 7.—Stickpin firmly imbedded in section of anesthetized area.

Fig. 8.—Lighted match held beneath patient's right, great toe. Anesthetized through pressure on inner surface of jaw in first zone.

Fig. 9.—Anterior quarter of tongue coated with tincture of iodine.

Fig. 10.—Four minutes after, complete absorption has taken place, and patient is indicating sensation of heat or reaction over several zones in chest where it is most pronounced. This reaction does, as a matter of fact, extend over entire body. It is easily demonstrated that the tongue, when firmly compressed by the teeth, will produce relaxations of the entire body, and in susceptible individuals a moderate amount of anesthesia of the entire body, for the mouth is also divided into ten zones. These illustrations point to possibilities of speedy absorption of toxins from the inner surface of neglected teeth and gums.

Figs. 11 and 12.—Profile and full face and neck of patient from New Hampshire, who consulted me April, 1, 1914, with well-marked bilateral goitre of two years' standing. Infection apparently from inflammatory process in first zone, left jaw. This was speedily overcome by Dr. W. J. Hogan. Patient had had constant pressure and frequently pain over sternum for three months. Patient responded quickly to distal pressures, and was agreeably surprised to learn, although at first unwilling to believe it, that the pain and pressure would disappear for hours after pressure, as depicted in illustrations. Twice daily patient exerted pressure on posterior wall of epi-pharynx, via nostrils, with cotton wound applicator moistened with spirits of camphor, the camphor for its antiseptic effect merely. Patient returned to New Hampshire the first of May, after one month of treatment, or fifteen visits, considerably benefited. The growth had entirely disappeared the middle of June.

Figs. 13 and 14.—The two last photographs were taken in Hartford, July 1st. Pressure through thumbs, index and middle fingers of both hands and posterior wall of epi-pharynx, which she continued at home, is the only treatment she received.

Oral Prophylaxis the Guardian of Health.

By JULES J. SARRAZIN, D.D.S., New Orleans.

Read before the Louisiana State Dental Society on June 4, 1914, and by invitation before the Mississippi State Dental Association on June 23, 1914.

History.

The patient's case was first diagnosed as malaria and later as typhoid. She had been confined to her bed for about three months. There had been a chill

one cold morning returning from a ball. Fever followed, which became intermittent in character; chills became periodical; all appetite and strength failed; she grew emaciated; cachectic eruptions appeared on the body. During the fall of the previous year a dentist had given her mouth many examinations on account of an impacted upper canine, which, he finally had located by radiography, and which he successfully removed shortly before she became ill. The first physician who attended her made out the septicemia later, and diagnosed malignant endocarditis. Treatment thus directed afforded no relief. In fact, she was steadily losing vitality and resistance at the age of twenty-four.

Dr. Otto Lerch was called in. His usual thorough examination, the story of the case and its symptoms convinced him that the cause of the septicemia must be found. Yet there was no clear accounting for it. He listened to the impacted canine anecdote, and the fact that he is one of the few physicians who thoroughly appreciate the influence of mouth conditions on health made him suspicious at once that the exodontia, which had required burring and lacerating, might have resulted in a wound which had become a focus of infection.

I made a thorough examination of the mouth under the usual difficulties of attending patients in bed, this time increased by the fact that the patient could not bear sufficient light in her room and lacked enough strength to maintain her jaws apart long enough to allow convenient probing. The exodontic wound had thoroughly healed, but slightly congested and tumefied gum margins reflected themselves in my mirror at the same time, while the remaining mucosa were anemic. The patient needing rest before she might again open her jaws, I kneeled on the floor to take the next opportunity to probe sockets around roots, but I felt quite sure that I was getting at the etiology of the case, and my posture was of no moment. I convinced the patient to allow more light in her room while she protected her eyes with a handkerchief, and each socket probing revealed advanced Riggs' disease, without wabbly teeth, and brought unmistakable traces of pus. The disease, although worse in some quarters than in others, was general throughout the mouth. It must have had its initial stages at least eighteen mouths before, if not sooner. Early stages usually go unrecognized. Dentists never fail to diagnose Riggs' disease when teeth wobble from a gust of air, and when only a few may still be saved. Strong systemic resistance saves the health of the robust patient, or it may be but slightly impaired, due to a constantly high opsonism. Between these two extremes we see manifested all grades of resistance and collapse. This girl was of a frail type. She had kept irregular and late hours throughout the carnival season. The already infected blood current had predisposed the nervous system to

the chill felt in the early morning of that cold night returning from a ball. Office surgical treatment and proper home mouth hygiene, practiced in time, would have prevented the dire developments, but their necessity had not been diagnosed in the incipient and early stages of Riggs' disease. The majority of dentists do not realize that the slightest venous congestion of the oral mucosa or tumefaction of gingival margins anywhere in the mouth, approximately or at a tooth neck, means danger; when not already a separation of subjacent periodental membranes, there may be some frosty infectious deposits, decomposing serum, staphylococci and streptococci at least.

Thus the patient had been confined to her bed. The infection had been allowed to vitiate the blood current in the cancellous tissues of the jaws, while ingesta spread it through the alimentary canal for absorption into the general circulation, and she lacked the phagocytes and leukocytes necessary to wage a successful battle for her health.

Surgical treatment was out of the question for **Treatment.** the present. It might be started later, as soon as the patient convalesced. Dr. Lerch directed his treatment to fortify the patient, while I prescribed, to be used four times a day and twice during the night: Vident polishing tape rubbed between the teeth, against each one; a mouth wash containing tannin, iodin, and potassium iodid; a narrow Vident brush, to allow convenient universal reach; Vident No. 4 Riggs' disease powder;* and a Vident tongue cleanser three times in twenty-four hours. I impressed the trained nurse with the enormous importance of reducing the quantity of oral septic material so that less of it would stagnate in sockets and enter the alimentary canal. My lady assistant showed the trained nurse how to effectively apply the above articles, how to stimulate gum circulation with brush bristles, and how to massage gingival tissues so as to help the return of venous blood to the heart.

How little sick nurses know about the care of the mouths of their patients and concerning its necessity, especially following some surgical operation on digestive organs, is appalling. With many nurses it is very

*Vident No. 4 Riggs' Disease Powder:	
Cuttlebone (inside spongy portion only, pulverized to No. 120 fineness) ..	3IV
Pumice (No. 120 fine)	3VIII
Soda Bicarb.	
Sodium Chlorid	aa 3III
Acid Benzoic	
Boric Acid.	
Zinc Sulphate	aa 3IV
Thymol.	
Carbolic Acid.	
Eucalyptol.....	aa gr. V
Flavor q.s.	

difficult to have them follow such instructions, even in part, because they do not realize their importance and lack the desire to increase their own work. Their usual plan is to swab out the mouth when the patient asks for that service! How about the patient whose condition is aggravated by oral sepsis, and who really requires much more than a perfunctory half-strength H₂O₂ wet cotton wiping? Frequently when a patient under Riggs' disease treatment, who may have passed and recovered from the surgical stage, but still requires a close and careful maintenance of the prophylactic, must undergo some surgical operation, or may become ill, my lady assistant and I take special pains to train the sick nurse in charge of the case. The patient knows the importance of mouth hygiene and would readily submit to it, but the nurse usually neglects or omits it, with a result of actual damage, and a setback showing in the mouth, to say nothing of the ingestum which will have delayed the patient's recovery, and actually endanger it, when the surgical interference was in the alimentary tract.

The fundamental trouble is that few dentists teach proper mouth hygiene and its importance to all their patients, or else nurses would learn it somewhat; the next is that physicians, with a few exceptions, do not insist on the maintenance by nurses of favorable mouth conditions, because even they do not realize their full importance. Of course, mouth treatment for the sick room must be adapted from the usual home prophylaxis, with some modifications to suit conditions and to make it acceptable to the patient without compromising results. In fact, patients become grateful for the mouth comfort given them, and will readily submit to it; those accustomed to its proper practice during health will ask for it, to be told by the nurse, in some instances, that she dislikes taking care of the mouth, and that it is not her special business.

Fortunately, the trained nurse in the case of septicemia under consideration was one of more than ordinary intelligence, who realized that since we depended on frequency of topical applications to dissolve pus with tannin, while iodin and the potassium iodid exerted their germicidal and alterative actions, this treatment and its adjunct measures must be scrupulously enforced. She did so conscientiously.

Improvement in the patient's general condition began showing in the next forty-eight hours. Gradually, intervals grew between the periodic high fever spells, while more and more favorable symptoms developed, even to a reduction of the anorexia.

Dr. Otto Lerch had been delaying the start for his European vacation. Dr. A. E. Fossier, his associate, knew all details in the case, and had also been attending it since the beginning. The patient's condition continued to improve steadily, but it was to be expected that it would be a

long and slow journey from an alarmingly dangerous condition to convalescence. However, the march in that direction was steady and seemed assured.

On my return, after attending the Kansas City meeting of the National Dental Association, my first office inquiry was about the young lady patient's condition. It was met by a funeral notice. I was dumbfounded. Getting into communication with Dr. Fossier I learned that just as I left New Orleans, a previous engagement had called away the nurse on whom we depended. Another medical nurse was called in to replace her. She was told of the training which had been given the first one by myself and my lady assistant; of our explanations, demonstrations and reasons for thoroughness in the mouth treatment. Such transmissions of responsibility lack impressiveness enough to cause them to be thoroughly realized, even when they are conscientiously accepted and discharged. How much unintentional fault there may have been in any one of these factors remains a mystery. The crisis of the battle was on. The patient continued to improve by discouragingly slow strides. The question was how much longer the advantage could be kept on the side of phagocytes and leukocytes. Dr. Fossier, fearing that the mouth infection was not being reduced as well as previously, inquired into the matter, to be told that the patient's weakness did not always allow carrying out the full program. His perfect knowledge and realization of conditions made him remonstrate, of course.

Meanwhile, the proportion of infectious organisms had been increasing, because their source of supply had grown. As long as measures had been effectively enforced to reduce the volume of mouth infection, the protective phagocytes and leukocytes had been in sufficient quantities to overpower and destroy the invading streptococci and staphylococci, constantly reducing their numbers in the blood, giving rise to a slow improvement, which was maintained for some time after thorough mouth treatment failed, because the defenders had by that time increased in sufficient hordes to repel and conquer a larger number of invaders. But when the multitude of the latter became overpowering, all the resisting force had been exhausted; the cerebrum and then the cerebellum succumbed; death came almost suddenly. Its certificate was signed by Dr. Fossier for pyorrhea alveolaris as the *primary* cause of death.

Robust constitutions are not exempt from fatal terminations caused by oral sepsis. The difference consists in a much longer period of resistance during which the etiology of the systemic disturbances is so clouded that a diversity of chronic organic lesions are diagnosed until the final crisis is reached, at which time some more or less hypothetical cause is ascribed for death, without any realization of the fact that con-

stantly increasing septicemia has been its determining factor. Usually the etiology of the case has been clear at no stage of it.

**Case from
Practice.**

Some ten years ago the mouth of a robust fellow of thirty years showed me a clear Riggs' disease condition. No teeth were wabbly, but many lacked normal firmness, and shallow proximal pockets could be detected on roots here and there. I warned, and treatment was started, but the patient's cerebro-spinal system was already affected both by septic ingesta and by frequent doses of alcohol, which he constantly repeated, because he was the owner of a barroom. He found it preferable to avoid a treatment, which to him was a nervous strain and seemed severe, although, comparatively, it was not, due to the fact that his case was just somewhat passed the incipient stage. A couple of years later he was back, brought by constant discomfort and occasional pain, the origin of which was in the root sockets. There were large pus pockets. Some roots were drifting out of normal position. A few molars were loose, but not yet shaky. He had developed Bright's disease, severe arthritis, migraines and occasional dizziness, unaccompanied by costiveness. He was more nervous than ever. Plainly the cerebrum was becoming involved. He was under the care of one of our leading physicians, who, however, did not attach the importance I did to the mouth condition. I tried my best to make the patient realize developments to be expected; it was made clear to him that if he would save both his health and his teeth he must now submit to protracted severe treatment and effect half of the cure by his own efforts, or else he might better at once lose most of his teeth and save his health. The only hopeful feature was that he had sold his barroom, used no more alcohol, and was under a proper Bright's kidney diet.

This time he entered treatment, promising to submit to it and carry it out to a successful issue. In a few weeks his loose and uncomfortable molars had improved. He missed one appointment, and then another, and finally stopped coming, just when a good start at changing mouth conditions had been made. I was well acquainted with him, and whenever meeting him seldom failed to repeat my warnings. From time to time he returned for the removal of one tooth or another which troubled him too greatly, but never to submit to proper treatment. He had become practically rid of Bright's disease, showing the possibilities of a strong constitution even under such adverse hygienic circumstances. But in the course of a few years he began to break down. His occasional dizziness, which never had ceased, increased. The digestive apparatus failed. Bright's disease recurred, with frequent arthritis of the legs. He just lived through alternate spells of illness and comparative invalidism.

When a patient commits suicide by resisting correct advice, he usually blames results on everyone except himself. He followed the rule, and changed physician. Three years ago an original diagnosis of malaria was changed to typhoid, and later to cerebro-spinal meningitis. All along the odor from his mouth had been such that it was difficult to stand near his bed. The nurse had attempted the classical swabbing with half-strength H₂O₂, but his mouth was so painful that he had resisted, even though he had most of the time been in a semi-comatose condition, and seldom conscious. At times he fought to get out of bed. What is clear is that septicemia had at last affected the cerebellum. The certificate gave "infectious malaria" as the cause of death. Some form of infection was realized somewhat late.

The first fatal case related is typical of septic systemic developments where a frail constitution lacks resistance to infection. The second portrays a strong constitution collapsing under a double morbid assault, after having clearly shown its ability to mend if not deprived of adequate aid; while a resisting organization of a class intermediate between the two already pictured would, without the maintainance of proper treatment brought to a successful issue, break down under the single infection of purulent root sockets, with periods of high and low resistance, until a fatal termination develops at the end of the usual varied and contradictory medical diagnoses, always because the fundamental etiology is not suspected.

It would not help the scope of this article, else I could indulge in the relation of more cases of oral sepsis with fatal terminations, observed during a period of fifteen years, since my eyes have opened to them.

Third Case from Practice. A case belonging to the class of single etiology and strong resistance presses itself so vividly forward as I write that I will relate it briefly. However, to make its narration really useful, let it be taken as typical of the march of the effects of systemic infection on the nervous centres, which other cases also illustrate. When other organic lesions complicate the morbid picture, there may be seeming temporary modifications, but the fundamental march remains clear in the background: The cerebro-spinal system is first involved, then the cerebrum, and finally the cerebellum. The factors of resistance and of single or complicated etiology determine whether this march is completed in a few months, or in a number of years. Therefore, I relate a last case simply as a final illustration:

Married woman, aged thirty-six years, became nervous and unusually irritable; robust, no organic trouble of any kind, perfect teeth, but shortly afterwards roots were drifting and pus was in sockets. All



ons good. First symptom of septicemia was articular arthritis which gradually growing in frequency and intensity. No constipation. Proper mouth treatment never instituted, because neither her sons nor her husband realized its proper character and necessity. Two years later gastritis began the collapse. Increased headaches; dizziness which resulted in a fall. Due to strong resistance, the first spell of pus fever did not occur until a couple of years later, from which she rallied and remained a comparative invalid. Diagnosis had varied from cerebral congestion to a blood clot, and in the next two years another spell of fever closed the drama, during the last act of which the odor of the mouth had been unbearable. A portion of the time the diagnosis was tumor, and at the end it changed to abscess in the brain. The primary cause of disease was recognized in death.

owing to unusually great systemic resistance to infection, or to other conditions and socket developments which rapidly shed out diseased roots, or force their extraction, the majority of Riggs' disease has become edentulous in time to escape loss of health. Knowing their own experience of discomfort with natural organs and ease of prosthetic ones, they unintentionally mislead their closest and dearest fellow-beings with the statement that they are better off with artificial dentures than ever they were with their natural teeth, being ignorant of the fact that their chewing power has been reduced to nothing, and that it is always a question how long digestive and assimilative functions can supply the increased work required of them before a dangerous lack of equilibrium develops.

**Riggs' Disease
is Preventable.** The saddest part of it all is that Riggs' disease is preventable. Nature's plan is the frequent, vigorous mastication of hard, fibrous, raw, vegetable or animal material, coupled with constant active exercise in the open air, often interrupted by periods of rest in a horizontal position. Details studied out from these facts and their fundamental pathology and prophylaxis would require an article as long as this one is.

Find supplies the artificial substitutes for local prevention. They consist in the proper brush and proper polishing on oral hard tissues, augmented by polishing tapes on approximal surfaces; all being started in early life, repeated at proper times to prevent any fermentation and formation of any deposits anywhere at gum margins, with the proper angle of bristles to stimulate blood circulation without injuring either the soft tissues. This, started in early life, and thereafter permanently maintained, constitutes practically absolute local prevention. Home

prophylaxis which is not scientifically thorough is not absolutely reliable, and it becomes the *guardian of health* in a measure only, but always in a most generous measure. Here again pages upon pages could be written.

The fundamental prophylaxis applying to the systemic background, and hinted at in Nature's plan, can never be disregarded, whether from childhood up, or when Riggs' disease shows its incipient symptoms, or its advanced stages. That plan guides and teaches the reliable therapy to apply. We could pause here again to consider a multitude of details to follow out. It is idle to stimulate surface capillaries with bristles unless the pump is helped to rhythmically and powerfully fill underlying pipes with blood of improved quality, to dislodge venous congestion and destroy infection.

It is incipient Riggs' disease conditions which we must learn to recognize early if we would protect our fellow-beings against disease, and in some cases against death. This is the stage at which the battle can be fought with assured victory and with the least effort on the part of the operator and patient. Later the field is strewn with lost limbs.

Oral sepsis begins coincidently with habitual or frequent fermentation, and the danger signal is there.

Facilitate home prophylaxis to patients, make it less irksome and more reliable by properly proportioned and properly shaped utensils to be used in conjunction with scientifically efficient mouth preparations. Teach them *how*, *when* and *why*, and in direct proportion as we truly help, we require more and better co-operation, and we expect and obtain better results.

Office prophylaxis and Riggs' disease surgical treatment fail without proper, faithful home prophylaxis performed with the help of reliable therapeutic adjuncts. This would add another chapter; but the strongest *guardian of health* is found at home, both locally and systemically.

Nothing better was ever done for humanity than the institution of school mouth hygiene, but if we would advance the cause of health and happiness, and hasten that millennium, we must also include adults.

Copper Cement Chemistry.

By W. S. MEDELL, B.Sc.

Read before the Lehigh Valley Dental Society, at its fall meeting, Mauch Chunk, Pa., September, 21, 1914.

"The vagueness and mystery surrounding the products which the dentist uses often enhanced by most confusing advertising gymnastics, are not a tempting barrier, with ever so fruitful a field behind it. It is a mistake, in my opinion, from both scientific and commercial standpoint, to withhold enlightenment, and it is equally difficult to conceive any but good results by closer communion between dentist and manufacturer."

This paper is opened with the above paragraph, quoted from a paper on the chemistry of oxyphosphates read before the Colorado State Dental Society in June, 1902, and published in ITEMS OF INTEREST. It fits the present situation of the copper cement question like a glove. The object of this paper is to lay the cards on the table face up, so as to give the dental profession an opportunity to judge the situation in the light of full knowledge.

You have no doubt read many advertisements on copper cement in which this statement or its equivalent appears: "In order to clear the situation we give the following information." Upon reading the advertisement you have obtained about as much real satisfaction as did the old negro who was sleeping beside the fire while the 'possum was cooking. His young grandson came in and proceeded to eat the meal the old man was dreaming about. After disposing of everything in sight the youngster placed the bones and remnants on the table by his grandfather's side, rubbed grease on his mouth and fingers and departed. Presently the old man awakened, and remembering the joys in store proceeded to business. He at once discovered the state of affairs. He looked at the bones, examined his fingers, licked his lips and exclaimed, "'Fore de Lord, I done forgot I ate him."

James's Copper Cement. Dr. Ames was the first to introduce copper cement, and all other black copper cements are imitations of his product. I am sure there is not one exact reproduction on the market. Copper cements containing about twenty-five per cent. black oxide of copper were introduced a number of years ago in imitation of Ames. They were and are inferior to the original in many respects. The copper oxide content is not properly made.

Red Copper Cement.

About ten years ago Dr. Fleck introduced red copper cement, this being the first one other than black. Its use finally resulted, less than a year ago, in an imitation being placed on the market

by a prominent cement manufacturer, who at the same time introduced what is called "white copper" cement. Since then another manufacturer brought out so-called copper cements in all the colors of the rainbow. So much for the history of introduction of this class of oxyphosphates and their imitations.

**Dental
Cements.**

Dental cement and oxyphosphate cement are synonymous terms, because there is not a dental cement of any value whatever which is not an oxyphosphate. Crown and bridge, inlay, temporary, filling, silicate and copper cements are all oxyphosphates. They are all of the same general form, which is an oxide powder and a phosphoric acid liquid. Therefore oxyphosphate of copper must have its copper content in the form of oxide, otherwise it is not a copper cement. That is one in which the copper present has true cementing action. Such a cement can be only one of two colors, black or red, because Nature provides but two oxides of copper, cupric oxide, which is black, and cuprous oxide, which is red. To call any cement a copper cement simply because it has a small percentage of some copper salt in the powder or the liquid is a misrepresentation. The manufacturer of such an article is sailing under false colors. If his product had "all the characteristics of the black copper, except appearance," and was "the result of years of investigation of the copper cement question by real scientists," he would be more than glad to call it by its right name and distinguish it from all inferior grades. He would surely not state in the same advertisement which extolled its virtues that the black would continue to be used "where the color is not objectionable and a pronounced preservative effect is desired," and with the next breath, add: "The formula (of white copper cement) calls for a minimum of copper to give the full sedative and bacteriological effect."

**Red Copper
Cement.**

It is true that red is less objectionable than black as to color, but the main advantage is that it does not discolor tooth structure. At the same time it has all the cementing, antiseptic, sedative and preservative value of the black, because it is of the same type of construction. Therefore, there is no object in producing a red copper cement unless cuprous oxide is used wholly or in part. The imitation, mentioned above, is simply zinc oxide cement containing a small percentage of some copper salt, and does not owe its color to the presence of cuprous oxide, but to some other coloring material; probably iron oxide, which has no value except its coloring power. Red oxide of copper when burned in the air is changed to black oxide. All that is necessary to prove the truth of

the above is to burn some of this cement. It will not turn black. The original red copper cement powder does turn black on being burned. Any chemist will bear witness to the truth of the above statement.

The manufacturer introducing the Joseph's coat color scheme is the only one who makes any attempt to prove the germicidal properties of his product. He publishes a letter from the man who did the work, which describes the method used in testing, and says: "Three other brands of copper cement were tested in the same manner." Just why he makes this statement is hard to discover, because he fails to give any results by which to make comparison. He probably omitted these results for very good reasons. The letter further states: "During this work another advantageous property of your cement was noted, in that there was almost no diffusion into the surrounding media of the soluble copper salts, which might be both poisonous and irritating."

This statement most surely discloses the writer's lack of knowledge in regard to the subject. It is a well-known fact, demonstrated by years of dental practice, that true copper cements, even when containing over ninety per cent. of copper oxide in the powder, are decidedly non-poisonous and far from being irritating, nay, are markedly sedative in their action. Furthermore, the above tests were completed in two days. What guarantee can they give that the cement will retain its germicidal properties indefinitely?

A dentist, who is a personal friend of the manufacturer, reports as follows: "For more than a year I have been testing this material in every conceivable way . . . and the only point I felt was not yet settled by these tests was that of its germicidal property, and my report to you has been delayed on this account. I have felt that sufficient time had not elapsed to determine this point from mouth tests. Now, however, since the report sent me (the one referred to above) is so conclusive as to definite germicidal action, I feel that this point should be considered settled." His personal friendship is quite evident when he is willing to substitute a two-day test for lack of results in his own experience of "more than a year, . . . testing . . . in every conceivable way."

**Black Copper
Cement.**

The manufacturer of the original black copper cement has carried on a campaign of advertising claiming that a copper cement which is a combination of zinc and copper will have no value imparted by its copper content, even though it be an oxide, unless there is present practically one hundred per cent. of such oxide. The advertisements put out in this campaign were confined to *claims* up to a month or two ago, when reference was made to an article by Dr. W. V-B. Ames in the following words: "We invite the checking up of the work of Dr.

Ames, published in the *Dental Review*, June, 1914, by any 'Institute of Industrial Research,' or any scientific individual." After reading the article in question I decided to accept the invitation on the grounds that I am a "scientific individual," whatever that means. Not being a bacteriologist, I shall confine myself to a discussion of the chemical side of the paper. On pages 4 and 5 of the reprint of the article the following statements appear:

"Most important of all, from the standpoint of proper understanding of what may be expected from admixture of cement-making oxides, is the information gained by analyzing the soluble salt produced and available for analysis in the fresh cement.

"Chemically, it happens that the salt formed during the mix is at the expense of the zinc oxide, which fact forthwith removes all chance of discussion. Copper oxide, properly added to a zinc oxide cement, will give added integrity of mass

"The blending of zinc and copper oxides and then subjecting the mixture to the action of an acid phosphate solution is analogous to placing sheets of metallic copper and zinc in an acid solution to constitute the galvanic battery. In such a battery the solution of metal is entirely at the expense of the zinc, just as in this cement all salt formed is at the expense of the zinc oxide, except when nearly 100 per cent. oxide is contained.

"With mixed oxides the copper salts formed after setting will be less in proportion to zinc salts than the relative proportion of copper oxide to zinc oxide in the mixture, or entirely absent. . . .

"It is easy to demonstrate that there is nothing else than the zinc salt formed in such a zinc copper mixture unless the copper content reaches so close to 100 per cent. that there is no argument in favor of the zinc oxide admixture. Chemical analysis of solutions obtained by puddling freshly mixed cement in water, easily shows evidence that metallic oxides obey the same law which governs the corresponding metals in entering into combinations. Metallic oxides, like the corresponding metals, obey the rule of electro-chemical potentiality in entering into combinations. The oxides interesting to us as cement ingredients occupy relations as follows, starting with the most positive, i. e., zinc, iron, cobalt, copper, mercury; the zinc being positive to iron, the iron to cobalt, the cobalt to copper, and copper to mercury, each metal or its oxide being dissolved when subjected to acid in the presence of one to which it is positive.

"Chemical analysis will show that there is no copper salt formed when either cobalt, iron or zinc oxides are mixed with copper oxide, unless the copper predominates to the extent of nearly 100 per cent."

**Tests by
the Author.**

Demonstration is better than explanation. Therefore, I will perform a few experiments in checking the above statement. First, consider analyzing the soluble salt formed in the fresh cement and the claim that in a mixture of zinc and copper cement-making oxides the salt formed during the mix is at the expense of the zinc, and that no copper salt is produced unless nearly 100 per cent. of copper oxide is present. Take the five cements before us. No. 1 is so-called "white copper," No. 2 is the light shade out of the rainbow, No. 3 is black copper made in imitation of Ames and is supposed to contain 25 per cent. black oxide and 75 per cent. zinc cement; No. 4 contains 25 per cent. black oxide and 75 per cent. zinc cement; and No. 5 is red copper containing 25 per cent. red oxide and 75 per cent. zinc cement. A mix of each one is made and puddled with water and allowed to stand for a time, as you see, then filtered and ammonium hydrate added in excess to the filtrate. We have no characteristic blue shade in No. 1 or No. 2; all the others, which are of the mixed copper-zinc type, do show the blue. This is contrary to the article quoted. It is here demonstrated that soluble copper salt is formed even where the copper oxide content is much less than the zinc, and none where copper salts are used in the place of oxides.

It is also stated that the addition of copper oxide to a zinc cement improves its structure; also that the copper salts formed after setting are less in proportion to zinc salts than the original proportion of copper to zinc. This, taken in connection with the other statements, clearly indicates that the author of the paper reasons that no acid phosphates of copper are formed under the conditions mentioned, but that oxyphosphate of copper is finally formed. It can be demonstrated to the satisfaction of any chemist that the reaction involved between powder and liquid in all oxyphosphate cements proceeds in the following manner:

The first additions of powder form acid phosphates, which are soluble; as more and more powder is added saturated phosphates are formed, the same being insoluble; and finally, when the last quantities of powder are added, excess oxide is present and we have the oxyphosphate. Then if no soluble acid phosphates are formed at first there will be no oxyphosphates formed after setting has taken place, because the nearly neutralized acid present, after setting, will not react under conditions which prevented the action of the unneutralized acid in the first place.

Again: "Chemical analysis shows that metallic oxides obey the same law which governs the corresponding metals in entering into combinations." Take some metallic copper, add to it some dilute phosphoric acid and boil. What happens? As far as chemical reaction is concerned, nothing. The metal does not go into solution. On the other hand, take

some copper oxide, treat it in the same way with phosphoric acid. Solution takes place. Not only does solution take place, but it takes place very quickly. Take some red oxide of copper, treat it like the black. Now we see a change; the color is darker and on filtering we find there is copper in solution. What has happened? Simply this: In cuprous oxide there are two atoms of copper; when treated with phosphoric acid these two atoms react on each other; one is oxidized to the cupric state, the other is reduced to the metallic state. The first goes into solution as cupric acid phosphate, the second remains behind as insoluble metallic copper, and we have the proof, in one and the same reaction, that oxides do not enter into combination in the same manner as the corresponding metals.

In regard to one metal or its oxide being dissolved in acid in the presence of one to which it is positive, let us see. To a mixture of zinc and copper filings, 75 per cent. of the first and 25 per cent. of the second; add some dilute nitric acid, then an excess of ammonium hydrate. Copper is in the solution. To an alloy of zinc, between 85 per cent. to 90 per cent., and the balance copper, add some dilute nitric acid, then ammonium hydrate. Copper again in solution. In the list of metals which interest us as cement ingredients, aluminum is not mentioned. Why? For the following very good reasons: Into an acidulated solution of copper drop some metallic aluminum, boil and observe that all the copper is deposited. Pour off the liquid, wash with water, add dilute nitric acid and observe that the copper goes into solution, the aluminum does not.

Lastly, he states that in mixtures of iron and copper oxides there is no copper salt formed unless the copper predominates to the extent of nearly 100 per cent. Take a mixture of iron oxide 75 per cent. and copper oxide 25 per cent. Boil with nitric acid, filter and add ammonium hydrate. Large quantities of copper prove to be present and very little, if any, iron.*

*All chemical experiments mentioned in the above paper were performed by its author before the Lehigh Valley Dental Society on the day it was read, thus demonstrating the scientific exactness of the statements made.—J. C. HERTZ, Chairman of Committee.



The Greatest Problem of the Day in Dentistry.

Grieves, Hartzel, and other research workers and sound thinkers in our profession, are declaring that arthritis, cardiac lesions, and other dreaded diseases may often be directly traced to the septic roots of improperly filled teeth. Indeed, the dangers from septic conditions about and around the teeth have been described and printed in so many dental and medical periodicals, and evidence as to the correctness of the statements has been so convincing that no one has the temerity to deny that an improperly filled root canal may become the direct cause of invalidism and even of death.

Once the layman fully grasps this, and stops to contemplate the menace to his health that poor dentistry may engender, will it be long before he begins malpractice suits against his dentist if he goes lame in his great toe after having a front tooth filled? But how is the layman to become informed, you ask?

By his doctor! The layman accepts anything that his doctor tells him, so long as he has faith; when he loses faith he gets him another doctor and then believes what that one says. But what does the doctor know? Little enough! Altogether too little in view of the seriousness of the situation.

The following is a true narration of an actual
In Experience. incident, and carries a moral; two morals, in fact:
A well-known dentist called on the writer re-

cently for an opinion as to the reading of several radiographs. The subject had an attack of rheumatism and visited her family doctor. The doctor, having read his journals, immediately suspected the teeth, and forthwith sent the woman to a radiographer; a medical radiographer. Upon receiving the films the doctor informed the woman that almost every molar and bicuspid in her mouth suffered from a blind abscess, and that until these were cured he could do nothing for her. Hence the visit of the patient to her dentist, and as a sequence his request for assistance and advice from a brother dentist.

A careful scrutiny of all the films showed first that they were not well taken, and that the depth of shadows were consequently not thoroughly reliable. Some one must have informed the doctor that a dental abscess shows dark in the films; therefore, every little dark speck in the film loomed large as an abscess to this medical mind. The first moral, then, is embodied in the rather old adage, that "a little knowledge is a dangerous thing," even for a physician. Further study of the films showed that of nine or ten suspected teeth, all but three enjoyed living pulps and sound health.

But! The other three teeth all had abscesses, and were teeth which had been filled by the dentist himself. The root fillings were imperfect, especially so since one of the root canal pastes had been used. The second and more important moral is that dentists must learn to properly fill roots, or else very shortly be prepared to be held responsible by patient and doctor for all manner of body ills when a radiograph can be produced that proves that his root work was imperfectly done.

**What the
Radiographer
Tells us.**

But the radiographers tell us that over seventy-five per cent. of the canals of multirooted teeth, and at least fifty per cent. of single-rooted teeth, show imperfect root canal fillings when tested with the X-ray. A number of our most careful and skillful dentists have proven that root canals can be properly treated and properly filled if the proper technique be employed, which includes at least two and often more radiographs to check up the progress and completion of the work.

With the adequate method constantly described in the literature, and

radiographic proof that his work was imperfect, what chance will dentist have before a jury in a malpractice suit, when the medical will testify, "This patient is crippled with arthritis for life, and the son came from these imperfectly filled roots. Had they been correctly filled, or had they been extracted, the patient would be a well-day."

course, the answer to all this is that if men do not know how to treat canals properly, they must learn. The skill must be acquired for their own safety and for the benefit of the health of the community. One just arrives at this deduction when some one rises on the floor discussion of this subject and asks this question of the essayist:

**How Shall
We Treat
Patients.**

"You tell us that a tooth should better be extracted than to be left in the mouth with the root imperfectly filled. Suppose you had a practice among the poor. Suppose that a pretty young woman should come in, and you should find a dead pulp in a central not yet discolored. She tells you that five dollars is the utmost she can spend on that tooth. Would you treat and fill the root, at least two radiographs, and fill the tooth likewise for that sum? Should you extract that girl's tooth?"

A few days later a correspondent, writing of the poor fees obtainable for dental service, declares it to be his opinion that half of all the dentists fail to earn as much as three dollars per hour. Of root canal treatment he says: "For teeth requiring pulp removal with all treatment and filling, five dollars is an exceptional price. Three dollars and a half is more commonly paid. I have lost a number of good families by the dollar charge." Later on he tells us: "It is a fact that a great many of patients are unable to pay large fees. They are supporting their families on from \$800 to \$1,500 a year. Mechanics earn good pay perhaps eight months every year, no more. Clerks, small business men, saleswomen, nine-tenths of the lawyers, ministers and physicians are forced to maintain their dignity on \$2,000 a year. Their family expenses keep them guessing."

Another dentist writes: "The use of the X-ray in root canal work undoubtedly the best and most scientific way, but how can a dentist afford that method for patients who cannot pay over five dollars for

the entire service? What are you going to do for the great majority of the people? The state of affairs as it appears to ninety per cent. of the dentists of this country is not so much that the patient is unwilling to pay, but rather that he is unable to afford the fees for high grade services."

These facts and these questions bring the dental

The Problem. profession face to face with a grave problem. The research worker tells us that imperfect root canal fillings may produce serious systemic lesions. The radiographer tells us that his findings prove the correctness of these views, but adds that with the aid of the X-ray, roots can be properly filled and aseptic conditions maintained. Then comes the plain dentist, not the one with the rich clients, but just the plain dentist working for plain people, and he asks, "How can I do my root fillings and get the radiographic work done, or do it myself, for the prices that my people can afford to pay. What shall I do?"

What shall we reply?



I HAVE JUST been to Boston. Spent all the morning in the Forsyth Dental Infirmary for Children. Wonderful place, but I can't tell you about it now. Spent the evening at a banquet. In New York after a banquet the boys usually get together in the grill for a little bite and a convivial talk, and all through that Boston banquet I was looking forward to the post-post-prandial, either in the English Room at the Thorndyke, where they have nice little corners for eight, fenced off from the madding crowd, or else at my own hotel, the Copley Plaza. And I certainly counted on some rare material for this department if I could but get a few of the intellectual spokes that radiate from the Hub of the universe, into that happy frame of mental exuberance where they could radiate to advantage—to my advantage, and yours.



T SAD TO RELATE nothing like that eventuated. I discovered that Boston retires at midnight. Observe that I said "retires." That is what the Bostonese do. When I retire, I just simply go to bed; but I do not go to bed at sixty minutes past eleven P.M. How can I? I live in New York. But I was in Boston you remark? True enough, and fact is I did go to bed, but I did not retire. I just lay abed thinking. Perhaps I may be able to interest you in my cogitations; perhaps not. Decide for yourself. Stop reading this as soon as you feel bored. But be fair! If you do read this to end, then you must admit that the reflections have touched a responsive chord. I hope they will.



D YOU EVER try to rethink, or let us say recollect your thoughts? You just let your mind drift, and at the end you are surprised to find that you are thinking about the Venus de Medici, and that startles you, because you distinctly remember that at the beginning you were ruminating about the mortgage on your office furniture, and you wonder how you ever passed from one to the other. If you succeed in retracing your mental steps you will find that there was a perfect sequence from your mortgage to the stone lady. So it was with me. When I awoke this beautiful Sabbath morning I remembered that I was thinking of Æsop's

❖ fables when I slipped off into dreamland, and I recollect that I had
 ❖ been thinking of the newest method of making porcelain crowns, at
 ❖ first. So, now as I sit in this comfy Pullman, I shall endeavor to re-
 ❖ arrange the links of thought into a chain that perhaps may prove a
 ❖ worthwhile Sunday sermon, which may tend to bind some of us more
 ❖ closely together into one grand and generous brotherhood.



AT FIRST I RECALL that I was thinking of a little talk I had had two days

❖ ago with Brother Legro, of Detroit, when he partook of luncheon with
 ❖ me at the Café Des Beaux Arts. So that, by the way, it began Around
 ❖ the Table after all.



ON LAST MONDAY night Dr. Legro read a paper describing his method of

❖ constructing porcelain molar and bicuspid crowns. The wonderful fea-
 ❖ ture of the Legro crown is that you can reproduce cusps, ridges, grooves,
 ❖ sulci and fossæ, just as accurately as can be done in gold with a casting
 ❖ machine. It is not my intention here to describe the method, for this is
 ❖ not to be a practical preaching, but merely a moralizing memory of
 ❖ that midnight meditation. At least, however, I must tell you that Legro
 ❖ first bakes a thin button of porcelain, just thick enough to represent the
 ❖ occlusal or cusped portion of the crown. This porcelain occlusal cusp,
 ❖ by Legro's ingenious method, can be accurately attached to the remainder
 ❖ of the crown, so that in the finished structure, it will accurately occlude
 ❖ with the antagonizing teeth of the opposing jaw.



LEGRO THOUGHT THAT the entire process was original with himself.

❖ And I guess it was. However, while at luncheon with me, he confided
 ❖ the fact that while visiting the office of Dr. F. T. Van Woert, he had
 ❖ been chagrined to have the party of the second part, to wit, F. T. Van
 ❖ Woert, prove that he, the aforesaid Van Woert, was, or had been, the
 ❖ party of the first part, insomuch as he was able to reach a hand into a
 ❖ drawer, and draw it out fairly well filled with porcelain occlusal cusps,
 ❖ the same having rested more or less uselessly in said drawer for some
 ❖ six or seven years.



IN THE EARLY hours of this Sabbath morning, long before the sun arose

❖ in that quarter, which makes it ever a symbol of the fact that out of the
 ❖ East came the Three Wise Men who discovered Him who was to teach
 ❖ unto mankind the brotherhood of man, I pondered over the problem of
 ❖ why members of the dental fraternity so often are unfraternal, one to
 ❖ the other.



I DID NOT ARRIVE at this view of the matter at the outset. At first I was

❖ thinking of Legro's disappointment at discovering that a part of his
 ❖ method had been thought of by another man, before he himself had
 ❖ thought it out. And then I began to study out why and how it had
 ❖ happened that Van Woert had thought of it. And from that I wandered
 ❖ over several interesting facts that I could recall from the past.



MADE A BUTTON of porcelain representing the occlusal surface a molar. Long before that Van Woert made a button of porcelain, which represented the occlusal surface of a molar. Query? Does the fact rightfully destroy Legro's claim to have produced a useful and original thing? Let us see!

■ ■ ■

VOERT MADE HIS porcelain occlusal buttons in the following manner. From the regular stock of one of the tooth manufacturers he selected certain molars and bicuspids, and ordered these delivered to him, cut only to the biscuit stage. He cut away all but the occlusal portion, and returned these to be fully fused. His idea was to utilize these as the tops, or occlusal surfaces of hand-made porcelain crowns. And the only reason why he had so many on hand when Legro called, was that the nice little scheme proved a failure.

■ ■ ■

READY-MADE porcelain occlusal buttons could not be made to properly occlude with natural teeth any more than ready-made gold occlusal buttons, which some manufacturers have supplied in times past, when it was the ridiculous fashion to grind the top off of a porcelain facing and solder on a gold occlusal tip, united to the backing of each fit, in alleged bridgework.

■ ■ ■

WE CAN GO STILL FARTHER back with the occlusal button proposition. I cannot recall just how many years ago it was, but it is on record, because we published the method. However long ago it may be, Van Woert one day invited me over to see a new method he had devised. And I may say that whenever he has worked out anything new, he has always given me first peep at it. This time it related to amalgam. His idea was to take impressions of natural teeth, fill these bush with amalgam in the molar and bicuspid regions, and when the amalgam had set he would have a number of buttons of amalgam each of which would be an accurate reproduction of the occlusal surface of a molar or a bicuspid.

■ ■ ■

AMALGAM OCCLUSAL buttons were to be kept on hand, and being copies of natural teeth, he thought that they could be roughened on the under side, and placed on the top of fresh amalgam in a tooth, so as to unite and form a practically perfect amalgam filling, with occlusal surface in beautiful imitation of Nature.

■ ■ ■

USIASTICALLY WE TWO proceeded to try the experiment. We packed amalgam into impressions of good natural teeth and obtained occlusal buttons that were beautiful. Then we took occluded plaster casts, carved cavities in molars and bicuspids, filled them with fresh amalgam, fitted the appropriate occlusal buttons, and had the satisfaction of seeing the two unite perfectly.

■ ■ ■

ONE OF US, I think it was myself, rushed into print, describing this process in the *Dental Cosmos*. I can't give the exact volume be-

- ❖ cause very stupidly the Pullman people seem to have omitted the *Cosmos*
- ❖ from the library on this train.

■ ■ ■

LATER ON, I TRIED the method in the mouth, and it was unsuccessful.

- ❖ Van Woert tried it, but his success was only a little better than mine.
- ❖ Trouble was in those days we had no real quick setting amalgam.
- ❖ Whether it could be done with the amalgams of to-day I do not know.

■ ■ ■

THINKING OF OCCLUSAL buttons made me think of another one, and

- ❖ this little story indicates how one man's idea is but the outcome of what another man teaches him. Dr. Norman W. Kingsley originated the following method of making a gold crown that would properly articulate.
- ❖ He would fit a band over the root to be crowned, fill it with plaster of Paris, have the patient close the jaws, and keep them closed until the plaster had thoroughly set. The band was then removed with the plaster adhering to it, and would be transferred to a fresh batch of plaster built into a little mound on a bit of cardboard, and when this plaster had set it was trimmed into the pyramidal form suitable for a zinc die. The top of this plaster model for the metal die carried the gold band, in which was the plaster which represented the bite. This plaster was then carved into the form of the occlusal surface of the tooth for which the crown was being made, and the circumference of this plaster was trimmed away sufficiently to fully expose the edge of the gold band.

■ ■ ■

WITH A METAL DIE made from this carved up model, Kingsley could

- ❖ stamp up a gold cusp which would exactly rest upon and match the gold band, and he could solder the two together so as to show scarcely any seam. I never could carry out the method with sufficient accuracy to make a thoroughly satisfactory union of the band and cusps.

■ ■ ■

TO RENDER THE UNION of the band and cusp portion more easy I

- ❖ adopted the following variation of the method. First I melted up small scraps of twenty karat gold into small balls, gold shot one might say.
- ❖ This I could sprinkle into my stamped cusps, and then with a few bits of solder unite the whole into a solid mass. By holding this solder side of the button against a flat grindstone I easily squared this surface perfectly smooth. I could then rest this gold occlusal button on top of my gold band, and one blast of the blowpipe would unite the two, giving me a crown with a solid top. Here then is one more version of the idea of using an occlusal button constructed first and then united with the rest of the crown subsequently.

■ ■ ■

ONE DAY A PATIENT PRESENTED with a tooth which I desired to

- ❖ crown, but the bite was so close that I could not make a crown by first constructing a band and then stamping up a cusp to be united with the band. Under the compulsion of necessity I proceeded to attempt a crown without dies. To the upper surface of my band I soldered a floor (or roof if you prefer) of platinum, allowing the platinum temporarily to extend beyond the band in all directions. On top of the platinum I then melted pure gold, allowing it to assume the globular form always result-

g from the cooling of the melted metal. This crown, with perfectly smooth top, was then placed in the articulator, and the occlusal surface dressed with burs in the engine. The method entailed a great deal of work, and was only warranted, if ever, when the bite was very short.



AT THIS POINT I remembered the crown devised by Dr. Chayes, which I believe, no doubt was entirely original with him, though its first principle was much like the last crown described. Chayes makes a band of iridio-tinum, roofed over with the same metal, the band and roof being united with platinum solder. Chayes then coats this completely with wax, and carves this wax into proper shape and occlusion. The wax is then replaced with gold by the casting process. Chayes had the advantage of the casting process for melting his gold, whereas I had only a blowpipe. Therefore he could do his carving in the wax, whereas I was obliged to carve the metal itself. Of course, the Chayes crown is far superior, yet if he had a patent upon it, and there should arise any occasion for disputing his patent, unscrupulous litigants could use my old and abandoned method as an argument for breaking the patent, making much of the unessential points of similarity, and belittling the really important differences.



EARLY, SUPPOSING THAT LEGRO had taken a patent on his crown, which, of course, he has not, someone knowing of the porcelain occlusal buttons of Van Woert, someone at the factory where they were made, let us say, might easily give evidence which might break the patent.



THE TRUTH is that Legro with his porcelain crown, and Chayes with his cast gold crown, each has provided for us a method by which a crown can be produced which, to the highest state of perfectness, will replace the lost organ. A crown of proper form, with accurate approximal contacts, and with correct occlusion. A crown, the occlusal surface of which will show cusps, planes, grooves, sulci and marginal ridges correctly carved and correctly reproduced. I say carved and reproduced, because in each instance the pattern is first made and carved in wax, so that at that stage it may be tried in the mouth and may be made absolutely perfect. Then in the Legro crown the wax pattern is exactly reproduced in porcelain, just as the Chayes crown is reproduced in cast gold.



MEN, IN REACHING the goal of real achievement, have trod somewhat along the paths already started by others, but the important fact which should be emphasized and remembered, but which is usually belittled, is that these men carried the processes further, finally reaching complete success, whereas their predecessors really abandoned their efforts as failures.



REGULAR CIRCUMSTANCE is that a vital claim for the Chayes crown is that by the method the occlusal surfaces can be accurately produced, and in the illustration used with my own published description we find that the occlusal surface shows well-defined cusps and sulci. True the picture shows an upper molar with five cusps, but that was a mere detail;

- ❖ a detail supplied by the artist. The sulci that look so well in the picture
- ❖ were likewise furnished by the artist. Certainly they could not have
- ❖ been considered essential by me, because if I had ever carved such deep
- ❖ sulci in solid gold crowns, with revolving engine burs, twenty-five years
- ❖ age, I should never have needed J. Lowe Young to tell me to carve
- ❖ sulci in the wax patterns of my gold inlays less than five years ago.
- ❖ Yet that article of mine and the illustrations that were published with
- ❖ it, could be used to break Chayes's patent—if he had one.



SIMILAR ARTICLES AND SIMILAR illustrations have been used to break

- ❖ patents more than once, the articles and the illustration, in the light of
- ❖ the later discoveries, being given a meaning that they never had when
- ❖ first printed.



IN THIS MANNER have we at times crucified those that have served us.

- ❖ Strange it is that we never seem to realize that the man who gives us a
- ❖ method, which provides for us an easier or a better way of doing some-
- ❖ thing, if encouraged, and praised, and thanked, might use his inventive
- ❖ talent to find us an easier or a better way of doing something else.



SOMEWHERE ABOUT HERE I thought of the fable of the Goose that

- ❖ laid the Golden Eggs, and of the Foolish Farmer who killed the Goose
- ❖ to get more eggs more quickly, only to discover after the Goose was
- ❖ dead that a Dead Goose produces no Eggs. And as I drifted into dream-
- ❖ land I was thinking of Æsop, and wondering if he would consider that
- ❖ dentists are Foolish Farmers!





The Forsyth Dental Infirmary.

The Editor of ITEMS OF INTEREST:

I beg the courtesy of your pages for a reply to your editorial in the
last number, on what you consider the inadequacy of the Forsyth
Dental Infirmary.

It was never proposed nor intended that the Forsyth Infirmary
should care for the teeth of *all* the school children of Boston. Your
content that it cannot do what it was never intended to do seems there-
fore hardly a sound criticism.

When the Infirmary was first considered, it was found that a large
percentage of Boston school children, mounting into the thousands, were in
such a condition that they might be called the "dispensary class" in regard to dental matters.
That is, they could not afford to pay a private dentist for the work needed
to keep their teeth. The Infirmary was planned to provide at a merely nominal
charge of a few cents the surgical facilities needed by these children, and
thus adequately supplied by the then existing clinics. Free dentistry for
the whole school population was never considered. The Infirmary has
therefore provided what it set out to provide. The fact can easily be proved
by making use of your own calculations, writing the correct figures in
terms of certain totals which you have apparently misunderstood. Very
simply, here is the demonstration.

In the year 1912-13, there were in the Boston schools not 122,000
children with defective teeth, as you have stated; but a total of 122,000
children with defects of all kinds reported by the school physicians. If your
figures had been correct, they would have meant that more than ninety-
four per cent. of the total of 128,000 children in the public and parochial
schools had defective teeth. You would perhaps not care to defend so
boldly an estimate.

Children with defective teeth were reported in the year named to a
total of 66,560. Of these, 42 per cent., or about 28,000 individual chil-
dren were taken care of by private dentists, under the direction of their
parents. Assuming what is not at all true, that the remaining 38,560

belong in the dispensary class, and that the Infirmary, as you estimate, would have to care for 80 per cent. of these, the Infirmary's charge would amount to 30,850 children a year. Assuming further your estimate of four carious teeth to each child would give us a total of 123,400 operations a year. For handling these you have credited the Infirmary, with only a part of its staff in, with 400 working hours a day for 305 working days in the year. This gives one hour, your allowance, for each operation.

This, please note, is for a partial staff, supposed to be dealing with the maximum possible number of patients. In point of fact, careful studies extending over several years have shown that the dental dispensary class in the public schools of Boston is well below a total of 20,000. We shall never have to deal with the 38,000 assumed for the purpose of these calculations. Your computation of a total of 390,000 operations a year is due to the mistake of multiplying the four jobs per patient into the total number of mouth defects of all kinds, instead of into the number of children with defective teeth, as is here done.

Actual experience shows that the Infirmary is doing much better than even your corrected calculations provide for. In the first seventeen working days of January, the Infirmary has treated 591 patients, performing on them a total of 3,818 operations of all kinds—including fillings, extracting, and cleaning. Each child was sent away with his mouth clean, and every possible repair finished. This averages a little over six operations per patient, for which your time calculations give us a total of 6,800 working hours, or about 1.7 hours for each operation. With the Infirmary staff full, your figures would give us a little over three hours for each operation, instead of the one hour you have set as a standard.

I trust this brief discussion will convince you that the work of the Forsyth Dental Infirmary was planned with full knowledge of the facts, and that ample provision has been made for doing all the work that the Infirmary set out to do. We expect, as our work of education progresses, that the total of decayed teeth among Boston school children will be sensibly reduced.

As to dental nurses in the schools. It has always been my personal attitude, that children should be taught at the earliest age to clean their own teeth, themselves, regularly and effectively. The Infirmary, both directly and through its social service department, will do its utmost to instruct its young patients and their parents to this effect. I consider the dental nurse plan you have advocated neither desirable in principle, nor in the long run effective, since it would stand in the way of creating in the child the habit of daily thorough cleansing of its own teeth. No other prophylaxis than this habitual daily cleaning of one's own teeth will ever reach high efficiency.

JOHN F. DOWSLEY.

NOTE OF REPLY.—It has not been the intent of the editor either in the January or in the February editorial to criticize the conduct of the Forsyth Infirmary, or to expound the intentions of the Board of Directors, in regard to which he was in total ignorance. The entire dental world, however, must be interested in this Infirmary, and the editorials merely discussed the possibilities of such an institution. Dr. Dowsley says that the writer would scarcely care to defend an estimate of ninety-five per cent. of dental defectives in the public schools. No one can tell definitely until an examination shall have been made by experts. According to Dr. Fones's report his hygienists have found an average of six cavities per child in one hundred per cent. of the four thousand children examined. Dr. Dowsley is quite right when he tells us that children must be taught to clean their own teeth, but thus far dentists have utterly failed to accomplish this, whereas Fones with his school dental hygienists is succeeding in this undertaking for the first time in the history of the world.—THE EDITOR.

Dental Dispensaries in Boston.

To the Editor of ITEMS OF INTEREST:

I have your magazine, ITEMS OF INTEREST, and in connection therewith beg to say:

You quote a paragraph from my speech at the opening of the Forsyth Dental Infirmary, as follows:

"With the establishment of this Infirmary, so wisely conceived and so patriotically carried out, the community can feel assured that every child in the Boston Public Schools will have all possible defects remedied before leaving school; and consistent with incurable physical limitations, these children will have a straight road from their education into their chosen paths of life." And then say: "This means that all the defective teeth of the children of the Boston Public Schools can be cared for by the Forsyth Dental Infirmary."

I did not mean anything of the kind and I did not say this.

There were 128,000 children in the Boston Public Schools examined.

Sixty-five per cent. of all these children were found to be defective in some form.

Eighty per cent. of the defects found were centered in the mouth.

In other words, the total number of defective children in the Boston schools was about 83,000, and all of those with mouth defects were 66,560. These, of course, include all kinds of mouth defects other than teeth.

Dr. Gallivan says that there are 58,000 children with defective teeth, and I think this is a minimum figure.

You are confusing the 58,000 children with the 122,000 defects found, which is quite a different matter, because one child might have two or three or even more defects, which would add to that total.

If you look at the report of my speech in your magazine, you will see that I said: "Of the total number of defective children found, forty-two per cent. of them were returned to the schools at the beginning of the next year with these defects cared for by the parents through the family physician." Our whole program was based on the theory that all the city should do is to find out what the defects in the children in the schools are and notify the parents. Generally speaking, except in cases of poverty or ignorance, the parent will see to it that the defects to which attention is thus called, are cared for, and although we are not yet far enough along to know what percentage of the whole these cases are, it is not so large as to be formidable.

We have, therefore, 66,000 mouth defects in one year, of which parents have taken care of forty-two per cent., leaving a balance of about 34,000 children having defects centering in the mouth, not all of which are dental defects: to be cared for in dispensaries or elsewhere; or less than 700 children a week.

Before the Forsyth Infirmary was built, Boston had four dental clinics: The Harvard and Tufts Dental Schools, the Massachusetts General Hospital, and the Boston Dispensary, with about 150 chairs for clinical use. With the Forsyth Infirmary, Boston has to-day 246 chairs.

Before the Forsyth Infirmary was started, some people who were interested in health matters in Boston, attempted to get these four dispensaries to open their doors six days in the week for children instead of one day as they were then doing; with the exception of Tufts Dental School all refused to do it. It will be seen, therefore, that all the existing clinics will have to do will be to use each of the existing chairs three times a week; to care once for the maximum number of children needing clinical dental treatment. If each child averages four cavities, they can each be attended to, leaving ample opportunity, during the balance of the week, for adults and the other clinical purposes of these institutions.

The impression I intended to convey was that with the Forsyth coming into the field, a stimulus has been given to other dispensaries to utilize existing appliances to better advantage instead of only one day in the week. The remedy of the defects found in the children in the schools is fundamentally up to the parents, and our experience will show that they can be depended upon to look after at least fifty per cent. of the cases of defects found. As time goes on, this percentage of cases

1 by the family physician and dentist will increase. Or assuming only forty-two per cent. of the defects found are cared for by the s, the Forsyth, with the other existing dental clinics, have ample es to care for all the children in Boston needing such treatment for l many years to come.

Respectfully yours,

EDW. F. MCSWEENEY.

OTE.—The misinterpretation of Mr. McSweeney's figures was dis-
d by the Editor, and admitted in the editorial in February issue,
was in press before the receipt of the above letter.—THE EDITOR.

Dental Nurses.

ITEMS OF INTEREST,

Sir:

Your article about the Forsyth Infirmary seems to me reasonable and all unfriendly. The amount of dental work to be done for school en is huge; and a single infirmary, even though a very good one, ot be able to deal with such a mass. The greatest obstacle I see e progress of dental work among school children is the objection many dentists make to the registration and employment of dental s. Many members of the profession seem to apprehend that wide- l employment of dental nurses will diminish seriously the amount rk to be done by male dentists. This opinion is not sound, and to be promptly overcome. I remember very well hearing compe- physicians and surgeons object to the establishment of schools for s on the ground that trained nurses would interfere with not only practice of physicians and surgeons, but with their due authority. e evils have not followed from the general employment of trained s.

Sincerely yours,

CHARLES W. ELIOT.



Angle's *Die Occlusionsanomalien Der Zahne*.

Zweite Deutsche umgearbeitete und vermehrte Auflage mit 806 Abbildungen.
Autorisierte Übersetzung von J. Grünberg, Orthodontist, Berlin. Redigiert von
Dr. A. Oppenheim, Wien. Verlag von Hermann Meusser, 1913.

The volume before us for review is the second German edition of Angle's well-known seventh American edition of *Malocclusion of the Teeth*. The first German edition appeared in 1908, a year after its publication in America, and this early demand for a second edition is the best evidence of the interest our German colleagues take in this phase of dental practice. The seventh American edition is not yet exhausted, and thus proves again the soundness of the charge so frequently made by publishers, viz., American dentists are poor book buyers.

The work has been considerably enlarged, containing many of the more recent advances in this field which were not included in the American edition. The translator and editor are to be congratulated on their skill and thoroughness. The mechanical perfection displayed by the publishers have probably never been surpassed.

The enlargements in the text largely occur in the chapters on diagnosis, on the tissues of attachment and the changes due to tooth movement, on regulating appliances, on anchorage and retention. Many new illustrations are introduced by the translator, which add greatly to the practical value of the book.

Everyone interested in this subject who is able to read the German language will find the volume a valuable addition to his library. The only



n of consequence that can be made is that which applies equally
redecessors by the same author, viz., it is too orthodox in much
aching, and too oblivious to the historical point of view. Because
many excellent practical methods, most students have overlooked
ove-mentioned shortcomings; but these, nevertheless, militate
its use as a college text-book.

B. E. L.

Oral Anesthesia.

By KURT HERMANN THOMA, D.M.D.

Publishers: Ritter & Flebbe, 120 Boylston St., Boston, Mass.

The author deals with his subject very thoroughly in eight (8) chapters. Under the heading of "Anatomy of the Oral Cavity" follows the "Topography of the Maxilla and Mandible," with a clear description of the second and third division of the fifth cranial nerves, liberally illustrated by photographs from actual specimens and schematic drawings. The third chapter gives the topography of the soft tissues covering upper and lower jaw on the buccal and palatal side and their relation to old and new method of infiltration anesthesia.

In describing the pterygo-mandibular space the author claims that the anterior alveolar nerve in a horizontal section through the human head is placed "in which mandibular conductive anesthesia is best accomplished," which is contrary to other findings.

Under "Pharmacology" a complete description of novocain and su-
cain syntheticum, including formula, chemical and physiological properties, dosage, etc., are given.

Seidel's sixteen theses on novocain suprarenin solution are a very
important part of this paragraph. They are well and clearly translated.

After describing Seidel's method of preparation of the solution the author recommends the tablet for daily use, and especially Tablet T. (the author's own formula) which promises to replace all others in the near future.

The fifth and sixth chapters are devoted to the instrumentarium and preparing of the solution. They are both very instructive and must surely be of great help to the student of local anesthesia.

In the chapter on "Local Anesthesia" proper the author illustrates practically the different methods; a glance at Fig. 31 makes further description seem superfluous. On account of the nerve-supply of maxilla and mandible, dental and surgical anesthesia is recognized.

Preparation of patient and of place for insertion of the needle are important. The author's method of pterygo-mandibular injection—



while undoubtedly answering the purpose—seems too complex and may discourage the beginner: right and left hand should be used for the respective sides to simplify the technique. Of the conductive anesthesias in the maxilla the zygomatic injection, as described by the author, is a distinct improvement over all the old methods. Infraorbital injections should also be given with both hands and the index finger *only* used for palpation.

Failures and ill-effects are admirably dealt with in the next chapter; it will be of great assistance especially to the beginner.

The book closes with a paragraph on the practical application of local anesthesia. Four very instructive tablets are shown and the subject dealt with under the headings of operative dentistry, crown and bridge-work, exodontia and oral surgery.

In writing this volume the author has shown himself not only to be a master of the subject, but also extremely capable of transmitting to others in a clear and concise manner what he himself knows. It must be highly recommended to everybody.

T. B.





National Society Meetings.

PANAMA-PACIFIC DENTAL CONGRESS, San Francisco, Cal., August 30 to September 9, 1915.

Secretary, Dr. Arthur M. Flood, 240 Stockton St., San Francisco, Cal.

State Society Meetings.

ALABAMA DENTAL ASSOCIATION, Montgomery, Ala., April 13, 1915.

Secretary, Dr. J. A. Blue, Birmingham, Ala.

ARIZONA STATE DENTAL SOCIETY, date and place will be announced later.

Secretary, Dr. J. L. O'Connell, Phoenix, Arizona.

ARKANSAS STATE DENTAL ASSOCIATION, Little Rock, Ark., May 13-15, 1915.

Secretary, Dr. W. B. Dormon, Nashville, Ark.

COLORADO STATE DENTAL ASSOCIATION, June 17, 18, 19, 1915.

Secretary, Dr. Earl W. Spencer, 119-120 Pope Block, Pueblo, Colo.

CONNECTICUT STATE DENTAL ASSOCIATION, Hartford, Conn., April 20-22, 1915.

Secretary, Dr. E. R. Bryant, New Haven, Conn.

FLORIDA STATE DENTAL SOCIETY, date and place will be announced later.

Secretary, Dr. Alice P. Butler, Gainesville, Fla.

Items of Interest

- ILLINOIS STATE DENTAL SOCIETY, Peoria, Ill., May 11-14, 1915.
Secretary, Dr. Henry L. Whipple, Quincy, Ill.
- INDIANA STATE DENTAL ASSOCIATION, Indianapolis, Ind., May 18-20, 1915.
Secretary, Dr. A. R. Ross, Lafayette, Ind.
- IOWA STATE DENTAL SOCIETY, Waterloo, Ia., May 4-6, 1915.
Secretary, Dr. C. M. Kennedy, Des Moines, Iowa.
- KANSAS STATE DENTAL ASSOCIATION, Topeka, Kans., April 27-29, 1915.
Secretary, Dr. A. L. Benton, Garnett, Kansas.
- KENTUCKY STATE DENTAL ASSOCIATION, Ashland, Ky., June 8-10, 1915.
Secretary, Dr. Chas. R. Shacklette, The Atherton Bldg., Louisville, Ky.
- LOUISIANA STATE DENTAL SOCIETY, Grunewald Hotel, New Orleans, La., June 3-5, 1915.
Secretary, Dr. P. Trowbridge, Franklin, La.
- MARYLAND STATE DENTAL ASSOCIATION, Baltimore, Md., June 11-12, 1915.
Secretary, Dr. F. F. Drew, 701 N. Howard St., Baltimore, Md.
- MASSACHUSETTS DENTAL SOCIETY, Boston, Mass., May 5-7, 1915.
Secretary, Dr. A. H. St. C. Chase, Everett, Mass.
- MINNESOTA STATE DENTAL ASSOCIATION, date and place will be announced later.
Secretary, Dr. Max E. Ernst, 614 Lowry Bldg., St. Paul, Minn.
- MISSISSIPPI DENTAL ASSOCIATION, Jackson, Miss., April 20-22, 1915.
Secretary, Dr. M. B. Varnado, Osyka, Miss.
- MISSOURI STATE DENTAL ASSOCIATION, Golden Jubilee Meeting, Jefferson City, June 10-12, 1915.
Secretary, Dr. S. C. A. Rubey, New York Life Bldg., Kansas City, Mo.
- MONTANA STATE DENTAL SOCIETY, date and place will be announced later.
Secretary, Dr. F. W. Adams, Chicago Block, Billings, Montana.
- NEW HAMPSHIRE STATE DENTAL SOCIETY, Weirs, N. H., June 22-24, 1915.
Secretary, Dr. Louis I. Moulton, 15 No. Main St., Concord, N. H.
- NEW JERSEY STATE DENTAL SOCIETY, Asbury Park, July 21-24, 1915.
Secretary, Dr. John C. Forsyth, 430 E. State St., Trenton, N. J.
- NEW MEXICO STATE DENTAL SOCIETY, Albuquerque, N. M., date will be announced later.
Secretary, Dr. J. J. Clarke, Artesia, N. M.



YORK STATE DENTAL SOCIETY, Albany, N. Y., May 13-15, 1915.
Secretary, Dr. A. P. Burkhart, 52 Genesee St., Auburn N. Y.

CAROLINA DENTAL SOCIETY, Wrightsville Beach, N. C., June 23-25, 1915.

Secretary, Dr. R. M. Squires, Wake Forest, N. C.

STATE DENTAL SOCIETY, Columbus, Ohio, December 7-9, 1915.

Secretary, Dr. F. R. Chapman, 305 Schultz Bldg., Columbus, Ohio.

OKLAHOMA STATE DENTAL SOCIETY, Oklahoma City, Oklahoma, March 15-19, 1915.

Secretary, Dr. C. R. Lawrence, Enid, Oklahoma.

PENNSYLVANIA STATE DENTAL SOCIETY, Reading, Pa., June 22-24, 1915.

Secretary, Dr. L. M. Weaver, Philadelphia, Pa.

CAROLINA STATE DENTAL ASSOCIATION, Columbia, S. C., April 13-16, 1915.

Secretary, Dr. Ernest C. Dye, Greenville, S. C.

MISSISSIPPI STATE DENTAL ASSOCIATION, Sewanee, Tenn., June 24-26, 1915.

Secretary, Dr. C. Osborn Rhea, 625½ Church St., Nashville, Tenn.

STATE DENTAL ASSOCIATION, Galveston, Texas, May 19-22, 1915.

Secretary, Dr. W. O. Talbot, Fort Worth, Texas.

STATE DENTAL SOCIETY will meet in San Francisco, Cal., during the Panama-Pacific Dental Congress in August, 1915.

UTAH STATE DENTAL SOCIETY, Boston Bldg., Salt Lake City, Utah.

KENT STATE DENTAL SOCIETY, May 19-21, 1915.

Secretary, Dr. P. M. Williams, Rutland, Vt.

VERMONT STATE DENTAL ASSOCIATION, Richmond, Va., Nov. 4-6, 1915.

Secretary, Dr. C. B. Gifford, Norfolk, Va.

WEST VIRGINIA STATE DENTAL SOCIETY, Wheeling, W. Va., April 14-16, 1915.

Secretary, Dr. J. W. Parsons, Huntington, W. Va.

WISCONSIN STATE DENTAL SOCIETY, Oconomowoc, Wis., July 13-15, 1915.

Secretary, Dr. O. G. Krause, 1209 Wells Bldg., Milwaukee, Wis.

Golden Jubilee Meeting of the Missouri State Dental Association

has been postponed until June 10th, 11th and 12th. Elaborate arrangements are being made to celebrate the semi-centennial meeting of the association on an elaborate scale. See special announcements in next issue of the *Journal*. For information address

S. C. A. RUBEY, Secretary.

Box 1017 New York Life Bldg.,
Kansas City, Mo.

Second District Dental Society's Annual Dinner.

You are invited by the Second District Dental Society to attend the annual dinner and meeting on Monday evening, April 12th.

You are especially and particularly invited to bring a friend—whether or not you receive an invitation by mail.

Reserve this evening for a meeting that will signal a marked advance in scientific dentistry.

We want you to hear, we urge you to hear Dr. Elmer S. Best, of Minneapolis, Minn., read his paper, "The Responsibility of the Dentist in Pulpless Teeth." This is the result of over two years' experiment, study and trial. Dr. Clarence J. Grieves, of Baltimore, and other able men, will discuss this problem.

You will realize, we are confident, that the scientific world and the world of public opinion are placing upon the dental profession's services a valuation and a responsibility new, serious and portentous.

Dr. Best has a forceful, convincing and intensely earnest personality. What he says you feel sure is true. His sound conclusions are projected with a relentless logic and delightful delivery.

The dinner (informal, \$2.50 per person) and the meeting will be held in the new Hotel Bossert, Brooklyn. The beauty of its refined elegance and the perfection and completeness of its appointments and services are unsurpassed. If it is more convenient to stay over night, you may do so at reasonable rates. Tables for six and eight will be reserved upon receipt of check sent and made payable to Arthur M. Hunter, Treasurer of the Dinner Committee, 67 Hanson Place, Brooklyn.

A. M. NODINE, Chairman,
F. C. WALKER,
A. H. HUNTER,

Dinner Committee.

New Jersey State Dental Society.

The forty-fifth annual convention of the New Jersey State Dental Society will be held at Asbury Park, on July 21, 22, 23 and 24, 1915.

The headquarters will be located at the Coleman House. The ball room will be used for all meetings of the Society.

The glass-enclosed Casino over the ocean, just across the ocean drive from the Coleman House, has been secured for the exhibits and clinics. With over 2,000 more square feet of floor space than the pavilion used last year, there should be adequate room.

Dr. Chauncey F. Egel, of Westfield, N. J., is Chairman of the Ex-



Committee, and reports that applications are already being made for

r. W. W. Hodges, of Perth Amboy, is arranging for an attractive clinics.

the Essay Committee, under the Chairmanship of Dr. James I. verton, of Trenton, will have three essayists of prominence to t.

cordial invitation to attend is extended to all ethical practitioners.

JOHN C. FORSYTH, *Secretary.*

30 E. State St., Trenton, N. J.

Illinois State Dental Society.

he fifty-first annual meeting of the Illinois State Dental Society e held at Peoria, Ill., May 11-14, 1915. President, J. M. Barcus, ville; Secretary, Henry L. Whipple, Quincy.

New Hampshire Board of Registration in Dentistry.

he annual meeting of the New Hampshire Board of Registration ntistry, for examination, will be held June 14, 15 and 16, 1915, at ic Banquet Hall, Manchester, N. H.

or application blanks or further information address

HARRY L. WATSON, *Secretary-Treasurer.*

3 Elm Street, Manchester, N. H.

North Carolina State Board of Dental Examiners.

he next regular meeting of the North Carolina State Board of Examiners will be held at Wrightsville Beach, Wilmington, N. C., ing promptly at nine o'clock on Monday morning, June 21st. Full nation and application blanks may be secured by addressing the ary.

DR. F. L. HUNT, *Secretary.*

sheville, N. C.

The Susquehanna Dental Association of Pennsylvania.

he fifty-second annual meeting of the Susquehanna Dental Asso- will be held at Irem Temple, Wilkes-Barre, Pa., May 18, 19 and 5.

GEO. C. KNOX, D.D.S., Recording Secretary.

ranton, Pa.

Texas State Dental Association

The Thirty-fifth Annual Meeting of the Texas State Dental Association will be held in Galveston, Texas., May 19, 20, 21 and 22, 1915. The special feature of this meeting will be post-graduate lectures and clinic work.

Dr. G. Walter Ditmar, of Chicago, will present modern scientific bridgework and removable partial dentures, with preparations, technique, and principles involved. Dr. B. F. Thielen will present "Plate Work"; Dr. T. G. Duckworth, "Orthodontia"; Dr. R. D. Griffis, "Nitrous Oxide Analgesia, and Anaesthesia"; Dr. Julian Smith, "Pyorrhea"; Dr. J. M. Murphy, "Local Anaesthesia."

Exhibitors are requested to attend and to write Dr. A. L. Frew, Dallas, for space. General clinics, last day. Clinicians write Dr. W. H. Nugent, Fort Worth. For any other information write the Secretary.

W. O. TALBOT, *Sec'y-Treas.*,

C. M. McCUALEY, *Pres.*,
Dallas, Tex.

Fort Worth, Tex.

Massachusetts Board of Registration in Dentistry.

A meeting of the Massachusetts Board of Registration will be held in Boston, Mass., March 3-4-5, 1915. For applications and further information apply to the Secretary, Dr. G. E. Mitchell, 14 Water Street, Haverhill, Mass.

Odontological Society of Western Pennsylvania.

The thirty-fourth annual meeting of the Odontological Society of Western Pennsylvania will be held at the Monongahela House, Pittsburgh, Pa., Tuesday and Wednesday, April 13 and 14, 1915.

The first regular session of the society will open on Tuesday at 10:30 A. M.

The Executive Council will meet at the Hotel at 10 A. M., for the transaction of business in the interest of the society.

The clinics and exhibits will be at the Monongahela House. Exhibitors are cordially invited to visit this meeting, and requested to make early reservation for space. Address Dr. Leslie Waddill, Jenkins Arcade, Pittsburgh, Pa.

A cordial invitation is extended to all ethical dentists in Pennsylvania and adjoining States.

KING S. PERRY, *Secretary.*

719 Jenkins Bldg., Pittsburgh, Pa

Examination of Dentists for the U. S. Army.

The Surgeon General of the Army announces that examinations for appointment of Acting Dental Surgeons will be held at Fort Slocum, New York; Columbus Barracks, Ohio; Jefferson Barracks, Missouri; Logan, Colorado; and Fort McDowell, California, on Monday, 12, 1915.

Application blanks and full information concerning these examinations can be procured by addressing the "Surgeon General, U. S. Army, Washington, D. C."

The essential requirements to securing an invitation are that the applicant shall be a citizen of the United States, shall be between 21 and 35 years of age, a graduate of a dental school legally authorized to confer the degree of D. D. S., and shall be of good moral character and health.

Acting Dental Surgeons are employed under a three years' contract, at a rate of \$150.00 per month. They are entitled to traveling allowances in obeying their first orders, in changing stations, and in returning to their homes at termination of service. They also have a privilege of purchasing certain supplies at the Army commissary. After three years' service, if found qualified, they are promoted to the grade of dental surgeon with the rank of first lieutenant, and receive thereafter the pay and allowances appertaining to that rank.

In order to perfect all necessary arrangements for the examination, applications must be in the possession of the Surgeon General at least four weeks before the date of examination. Early attention is therefore urged upon all intending applicants. There will be nine vacancies to be filled.

Dental Society of the State of New York.

The forty-seventh annual meeting of the Dental Society of the State of New York will be held at Albany, N. Y., Thursday, Friday and Saturday, May 13-14-15, 1915.

The Executive Council will meet at the Hotel Ten Eyck Wednesday afternoon, May 12th, at 3 P. M., for the transaction of business in the interests of the society.

The first regular session of the society will open on Thursday at 10 A. M. The literary program will be rendered in the auditorium of the New York Educational Building. Headquarters for officers and the Executive Council will be at the Hotel Ten Eyck.



The clinics and exhibits will be at the Hotel Ten Eyck. Exhibitors are cordially invited to visit this meeting and requested to make early reservations for space. Address Dr. O. J. Gross, Schenectady, N. Y., for space.

A cordial invitation is extended to all ethical dentists in New York and sister States.

A. P. BURKHART, *Secretary*.

52 Genesee St., Auburn, N. Y.

Lake Erie Dental Association.

The Fifty-second Annual Meeting of the Lake Erie Dental Association will be held at the Hotel Bartlett, Cambridge Springs, Pa., May 20th to 22nd.

DR. J. F. SMITH, *Secretary*.

Erie, Pa.



Items of Interest

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Subscription, \$1.00 per year, in advance, to United States, Mexico, Cuba, Panama and other American territorial possessions. Canada, \$1.40. Other countries, \$1.75. Single copies of this issue, 15 cents (Domestic).

Subscriptions received at any time, to date from January or July. Orders taken by all leading dental dealers. Advertising rates made known on application. Remittances preferred by registered letter, postal money order or bank draft.

Notification of change in address should be made on or before the 10th of the month, in order to have change made in time for the following month's issue.

Address all business communications to Consolidated Dental Mfg. Co., Publishers, Nos. 130, 132, 134 Washington Place; 187, 189, 191 West Fourth St., New York.

Communications for publication department should be addressed to the Editor, R. Ottolengui, M.D.S., D.D.S., LL.D., 80 West 40th St., New York.



THOMAS W. EVANS



Treatment of Pyorrhea Alveolaris with Succinimide of Mercury.

By GEO. H. REED, D.D.S., A.A.D. Surg., U. S. Navy.

recent dental literature for the past few years has abounded in and learned discussions relative to the cause and treatment of pyorrhea alveolaris. Many and various have been the theories, the experiments and discoveries made, and labored treatises and published, all directed toward the illumination of this mystery.

recent announcement of Doctors Barrett and Smith, of the City of Pennsylvania, concerning the discovery of amoeba in the surrounding teeth affected with this malady, and the results with emetine hydrochloride, has provoked a vast amount of experimentation, which will doubtless be of material benefit to the dental profession and bring forth results of far-reaching importance in the treatment of this disease.

success of Dr. Barton L. Wright, of the United States Navy, in the use of succinimide of mercury for diseases of vegetable parasitic origin, by deep muscular injection, and the claims advanced by those who advocate this method in the treatment of tubercular cases and other diseases, led me to a series of experiments with this drug in an effort to adapt the unquestioned efficacy of these mercurial injections to the treatment of pyorrhea.

The value of mercury in infections due to vegetable parasites lies in the fact that it stimulates the production of antibodies in the blood, and thereby retards the activities of these parasites. But its more pronounced effects are based on Ehrlich's theory that for every vegetable parasitic organism there is a chemical affinity, which, if found and injected into the host, will destroy the infecting organism and thereby cure the disease.

The endameeba discovered by Doctors Barrett and Smith in their researches of pyorrhœal pockets, and which seems to have been accepted more or less generally as the specific cause of pyorrhœa, is not a vegetable parasite. Yet mercury clears up these severe cases in which the amoeba is undoubtedly present. This would seem to indicate that either the importance of the amoeba has been overestimated or that mercury is equally as valuable as a treatment for the same as emetin hydrochloride.

The first symptoms of its action are to be looked for in the mouth. If the use of mercury be persisted in, the gums become swollen, soft and spongy, bleeding on very slight abrasion. The exact action of mercury in pyorrhœa is not clear, but aside from a probable direct action on the causative organism, there are the well-known tonic effects of the drug. From the fact that larger doses cause swelling of the gums, followed by the soft, spongy, bleeding gum, it is fair to assume that mercury produces a hyperæmia of the gums proportionate to the dose. If such is the case, we have added to the germicidal action and tonic effects a local hyperæmia, the benefits of which have been pointed out by Bier.

It has long been recognized that in the treatment of pyorrhœa, local instrumentation alone is inefficient. So much depends on the physical condition of the patient that an attempt to correct the conditions of the mouth without a careful systemic medication is valueless where any degree of permanency is concerned. Therefore, in considering the adaptability of mercury as a cure, its well-known tonic effects make it worthy of special consideration.

Wright's Experiments. Surgeon Wright, in an article published in the *Medical Record* of July 10, 1914, announced that, based on the results of the experiments on mice made by Dr. Ehrlich, he commenced a series of experiments in the treatment of tuberculosis, the results of which convinced him that mercury is the chemical affinity for the tubercle bacillus, and if for the tubercle bacillus, why not for the entire group of vegetable parasites?

**Author's
experiments.**

A. Surgeon Matthew H. Ames, U. S. N., at my office in the Boston Yard.

The initial injection in the first instance was seven-fifth grains, made thorough instrumentation of the teeth. This was followed by an injection of one grain after an interval of three days, and by three-fifths three days later. The patient evinced no ill effect from the treatment except a certain soreness in the gluteal muscles, where the injection was made, which induced me to have him placed on the sick list for observation.

All discharge of pus ceased after the first injection. None could be produced by careful and firm pressure over the infected teeth. The teeth were still tender, particularly at the free margins. After the second injection, the patient announced that his gums "felt good"; there was little tenderness; the teeth were not sensitive to pressure, and the tissues assumed a more normal appearance. Two days after the third injection the teeth were noticeably firmer in their sockets; the patient could masticate ordinary coarse foods with comfort, and informed me that his teeth had ceased to bother him. Two weeks later the mouth presented a normal healthy appearance, with, of course, some recession of the gums.

In order to demonstrate the efficacy of the drug as a remedy for conditions in pyorrhea, without laying it open to criticism on the part of those who believe that the prescribed local instrumentation might be the chief factor in alleviating these conditions, I injected the usual dosage in the case of a man in particular, whose mouth presented a typical advanced case of pyorrhea, with a large quantity of pus exuding from around the necks of the teeth, which were so sore that they could not be occluded without difficulty. The injection was made at 10 A. M., and at 3 P. M. on the following day the patient came to the office for the express purpose of informing me that he could close his mouth without pain for the first time in a year.

**Technique of
using Mercury.** The technique for these operations as performed in this office is simple and occupies but a few moments' time. The chair is run up to the limit of its lifting range and the back dropped as far as it will go. The head-rest is reversed and lengthened, and the patient inclined to stand bent forward so that the abdomen rests on the chair with the head-rest projecting between the legs.

The field of operation is sterilized with tincture of iodine, and the injection made in the fleshy part of either buttock, care being taken to avoid contact with the bone. The injection is into the muscles of the buttock, as there is no structure that can be injured; the only precaution to be taken is that in case the needle goes in so far as the bone it should be withdrawn about one inch before injecting the solution.

The syringe should be of glass, having a capacity of about fifty minimis, distilled water being used, and the drug, which is obtainable in tablet form, dissolved in the syringe. The needle used is the one in common use for deep muscular injection, being two inches long, and should be inserted to its full length before pressure is applied to the piston. Should a syringe of lesser capacity be used and two injections be necessary, the needle should be detached from the barrel and its point be directed upward in order to prevent the injected solution from escaping. Everything should be sterile and the ordinary antiseptic precaution should be observed.

The drug is quickly absorbed into the system, the action commencing almost immediately after injection and continuing for about twenty-four hours. The patient will be conscious of a knobby, ball-like bunch, persisting for awhile at the point of injection. If symptoms of mercurialism, manifested in profuse salivation, the gums being hyperæmic and swollen, fetor of the breath, etc., are observed, the treatment should be suspended temporarily and resumed after an interval of about two weeks, or after corrective measures have had their effect.

In connection with these injections of succinimide of mercury, I have used several mouth washes, but have obtained the best results by using dioxygen up to the time of the second injection, and then substituting a wash having eight grains of zinc chloride and a drachm of myrrh to the ounce. I have also experimented with a mouth wash containing ipecac, using about two drops in a small quantity of water, this wash being advocated by those using emetine hydrochloride treatment.

Since this article was written, I have communicated with Dr. Paul G. White, Acting Assistant Dental Surgeon, U. S. N., at the Portsmouth Navy Yard, who informs me that he has successfully treated many cases of pyorrhea in conjunction with Dr. Wright, and to Dr. White all credit for the mercurial treatment is naturally due.

Dedication of the Evans Dental Institute.

The sixth epochal period has been writ in dental history.
The first was the founding of the first dental society, the American
Society of Dental Surgeons.

The second was the appearance of the first dental journal, the
American Journal of Dental Science.

The third was the founding of the first dental college, the Baltimore
College of Dental Surgery.

The fourth was the discovery of anesthesia by Horace Wells.

The fifth was the construction and endowment of the Forsyth Dental
Hospital and Sanitarium for Children by the philanthropists, the Forsyth brothers.

The sixth was the erection and endowment of the Evans Museum
and Dental Institute.

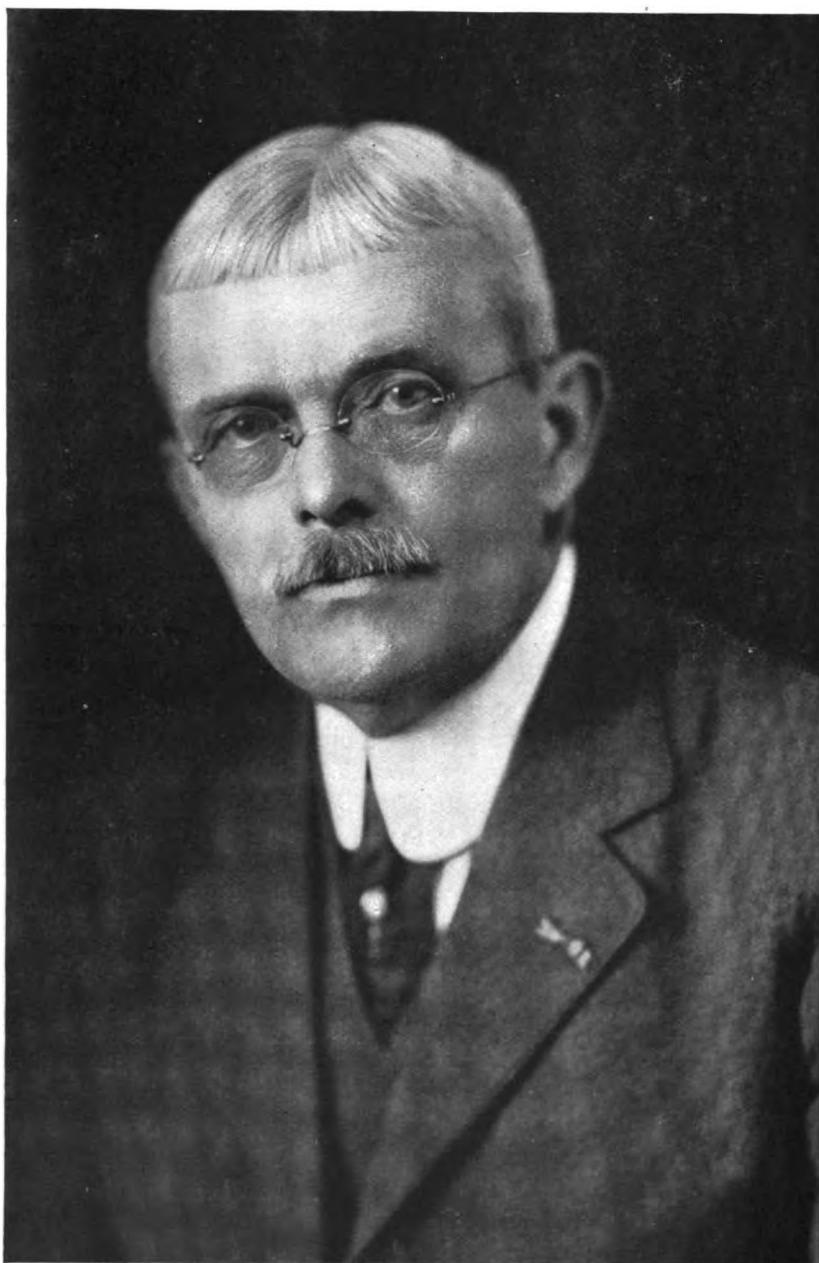
It seems quite fitting that the dedicatory exercises of this last named
institution should have occurred on the anniversary of Washington's
birthday, more especially as this wonderful gift to the dental profession
comes as a legacy of an American-born dentist practicing in a foreign
country.

The building is a marvel of architecture, and the last word in dental
invention, and being as it is a monument of the life work of one dentist,
it will ever stand as an inspiration, not alone to the students who may
complete their education within its walls, but to all others who may have
the opportunity of visiting and admiring this wonderful structure.

The procession was the most impressive one that has ever appeared
on the campus, and the dedication ceremonies occurred in the large clinic
of the Institute. Two thousand people witnessed the conferring
of honorary degrees upon eminent surgeons and the presentation of the
keys of the building by the architect, Mr. Windrim, to ex-Mayor John
Weaver, president of the Institute.

Mr. Windrim. "It is my great privilege to hand to you the keys
of this large institute building, designed according to
the schedule of requirements, prepared by Dr. Ed-
ward C. Kirk, and dedicated for all time to be the home of study and
research, and also to give acknowledgment to the great intelligence and
energy exercised by the superintendent of construction, Mr. W. R.
Hall, and also to thank the contractors who erected this building, Mr.
W. R. Hall and Mr. John H. Pomeroy."

Mr. Weaver in turn presented them to Provost Smith as head of
the University.



EDWARD C. KIRK, D.D.S., Sc.D., LL.D.,
Dean of the School of Dentistry



Smith. "To those who have contributed in any way to
this affiliation of the Evans Museum and the Dental
School of the University, the corporation of the
y offers sincere thanks.

good—and only good—be the result.

the benefits be reaped by mankind to the North, the South, the
West—by mankind everywhere!"

he three foreign scientists who received honorary degrees, Dr.
ward Mummery, of London, was the only one able to be present.

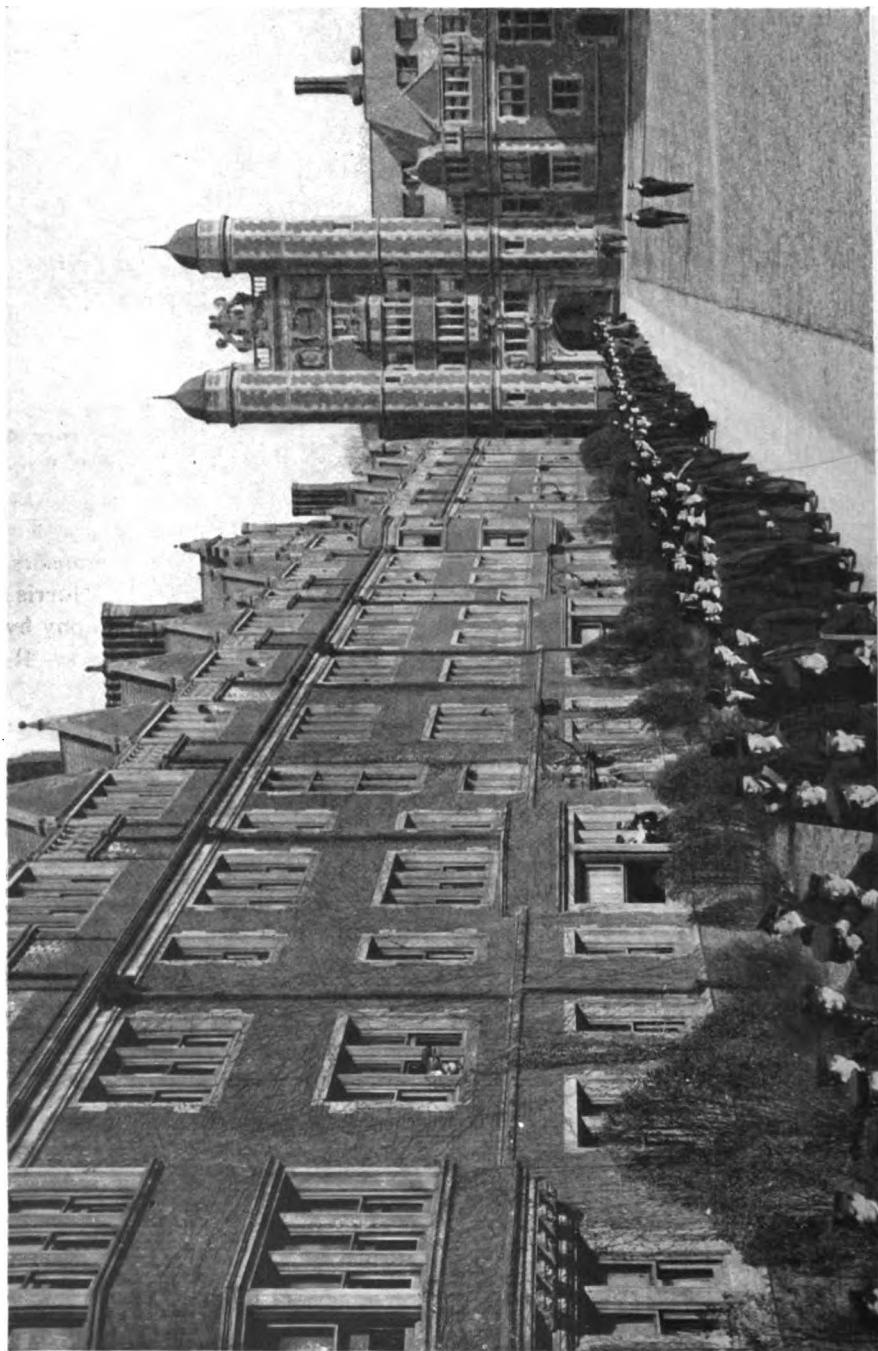
The honorary degree of Doctor of Laws was
conferred on Dean Edward C. Kirk and Dr. Edwin
F. Darby; the degree of Master of Science in Archi-
tecture on John T. Windrim, and upon the following

in the degree of Doctor of Science: William Simon, Truman
Brophy, Edward Hartley Angle, Eugene Solomon Talbot, John
Mummery, Edouard Charles Godon, Wilhelm Dieck, Greene
Black. The degrees were conferred in the following order,
candidate being escorted in front of the Provost by two sponsors.
Windrim was escorted by Charles L. Borie and George H. Norris;
Simon by John Marshall and A. P. Lee; Truman W. Brophy by
H. Cryer and Robert Ivy; Edward H. Angle by Charles R.
and James G. Lane; Eugene Solomon Talbot by Louis Meis-
of Buffalo, N. Y., and Edward G. Link, of Rochester; John
Mummery by Arthur Hopewell-Smith and Sydney A. Sands.
Degree to Edouard Charles Godon, of France, was conferred upon
absentia. He was represented by a member of the French Emb-
assy who was escorted by H. B. Matteossian and Henry L. Weber, of
Wilhelm Dieck also received his degree in absentia, and was
escorted by a member of the German Embassy, who was escorted by
Prinz and Wilson Zerfing. Greene V. Black was escorted by
el Gildersleeve and M. T. Barrett; Edwin T. Darby by Joseph
e, of Hong Kong, China, and C. C. Voelker, of Brooklyn, N. Y.;
C. Kirk by Howard S. Seip, of Allentown, Pa., and V. S. Jones,
ehem, Pa.

The Evolution of Dentistry.

of Edward C. Kirk, D.D.S., Sc.D., LL.D., Dean of The School of Dentistry.

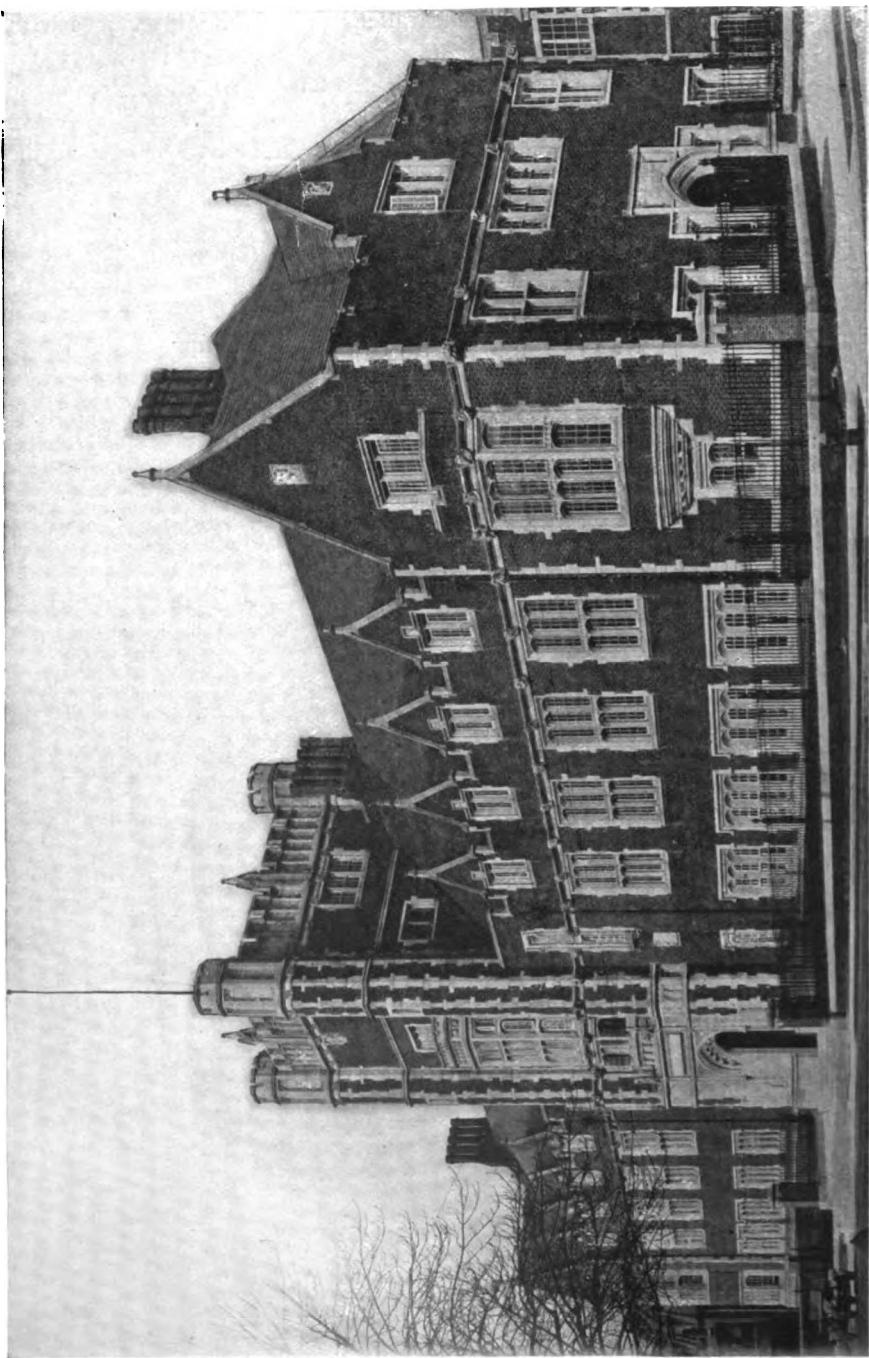
are met here to-day to signalize a new epoch in the educational
ment of a specialized field of the science and art of healing, which,
ganized professional activity, has just completed the seventy-fifth
its existence. The growth of dentistry, considered from the view-



of its formative forces, runs parallel in all essential features with evolution of the healing art in general.

Dentistry
in Ancient
Art.

There is every reason to believe that among the physical ailments which from the earliest times have impelled mankind to seek relief at the hands of the healer, the distresses arising from defective teeth have demanded attention. The treatment of dental diseases may, therefore, be regarded as coeval with the first efforts of primitive man to find relief from his other bodily infirmities. Evidences of existence of a large body of knowledge concerning clearly recognized dental disorders with suggestions for their treatment have been traced to a period as early as the first Egyptian dynasty, about thirty-seven centuries before the Christian era. It is highly probable that in that remote period the treatment of diseases of the teeth was carried on by the healer or physician of the time as a part of his general practice, but Herodotus, who wrote about 450 B. C., states that at his time there were in Egypt a number of physicians who, instead of practicing general medicine, devoted themselves to specialties, some treating diseases of the teeth, others diseases of the head, abdomen, etc., from which statement it appears that in the fifth century before Christ dentistry was practiced in Egypt as a distinct specialty. Dentistry as a specialty was practiced at a remote period by the Etruscans, who introduced the art to Rome. The practice of dentistry was so general in the second century B. C., that the ancient Roman law of the Twelve Tables contains a provision forbidding the burial of any gold with the body of the deceased person other than that which is used to bind the teeth together. If the statement of Pliny may be relied upon, the Romans had physicians for several centuries, and that the first to practice there was one Archagathus, a priest, who came to Rome in the sixth century before the founding of the city, an epoch some centuries after the promulgation of the law of the Twelve Tables. Pliny's statement might suggest that the need for the physician did not arise among the Romans until after their teeth had become defective, a suggestion the soundness of which modern investigation is tending more and more to establish. The high state of development of dental art in Rome about the beginning of the Christian era is clearly indicated by a number of writers of the time, among others, Horace, who in one of his satires depicts two Etruscans, Sagana and Canidia, the former as wearing a wig and the latter false teeth; also Martial, in a number of his epigrams, makes allusion to artificial teeth; thus in one of his poems he speaks of a certain Etruscan as having teeth of bone and ivory; in another epigram he praises the beauty of Lecania's teeth, "white as the snow," but further



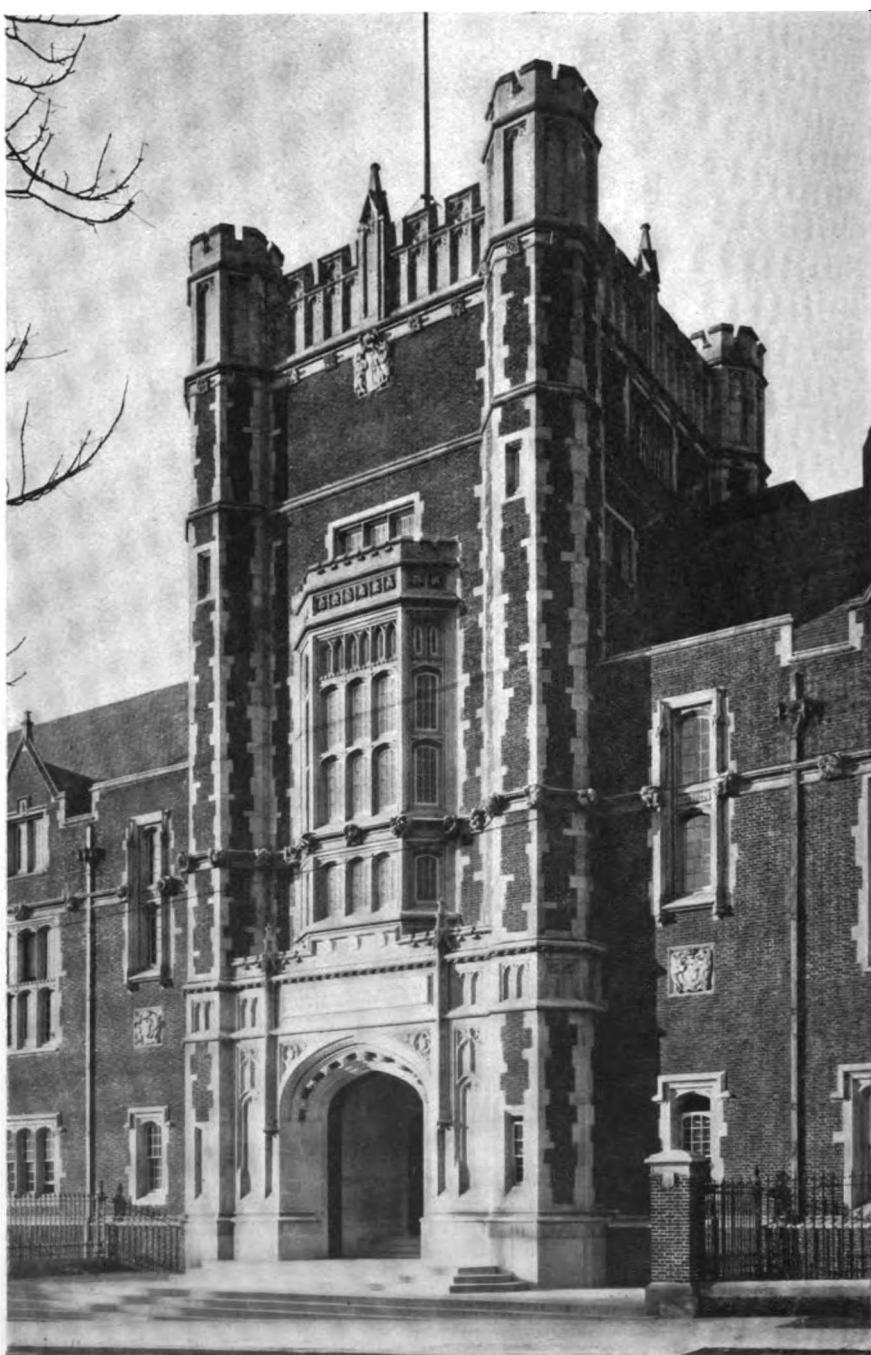


on he remarks that "they are not her own." And to another he says, "Your teeth, as your gown, you nightly remove." That these allusions to early dental art by the writers quoted are wholly justified has been comparatively recently demonstrated by the discovery in ancient Etruscan tombs of actual specimens of the dental art of the period.

I have drawn attention to these early historic records in order to emphasize the fact that the art of dentistry is very ancient, in so far as it had to do with the mechanical restoration of lost teeth by artificial substitutes and other forms of mechanical treatment of defective dentures. In this early epoch these restorative mechanical operations upon the teeth were performed by artisans or mechanics having no connection whatever with medicine or surgery. In the course of time it is highly probable that these operators upon the teeth were called upon to perform minor surgical operations and to treat certain diseases of the teeth; indeed, Martial, in one of his epigrams, mentions one of these ancient specialists by name. He says: "Castellius pulls and treats diseased teeth." On the other hand, diseases of the teeth themselves and the parts associated with the teeth have received the attention of physicians from the earliest time. According to tradition, Esculapius, who flourished some thirteen centuries before the Christian era, invented a number of curative measures for diseases of the teeth, and tradition accords to him the invention of the forceps for the extraction of teeth. Hippocrates, who wrote about 400 B. C., records in his work many observations relating to diseases of the gums and their treatment, but none of the early medical writers makes any reference to constructive dental art, which, until comparatively recent times, appears to have been a distinct specialty practiced only by those who were mechanics or artisans having possibly a very superficial acquaintance with the simpler disease conditions which affected the teeth upon which they operated. Their art was addressed simply to the restoration of defective conditions in the masticating mechanism by mechanical means.

It will thus be seen that dentistry has had a dual origin. Its problems in pathology have kept it in constant and vital relation with medicine, while its requirements in the restorative phase of its art have necessitated its relations with the craft of the artisan, and it is this latter feature so essential to its practice that has, in the course of its evolution, developed dentistry as a distinct profession, having a separate system of preparatory education, a special literature and a professional organization independent of medicine.

Throughout the long period of ignorance and superstition preceding the organization of the dental profession upon an independent educational basis, humanity was dependent for relief from its dental ills upon two



ENTRANCE GATE AND CENTRAL TOWER

types of practitioners: first, those who were medical men without knowledge or skill in the handicraft necessary to the successful performance of constructive restorative operations upon the teeth, and, secondly, artisans or mechanics more or less skilled in the filling and mechanical treatment of the teeth and in the construction of artificial dental substitutes. This, in general, was the status of affairs in dentistry up to the fifth decade in the nineteenth century.

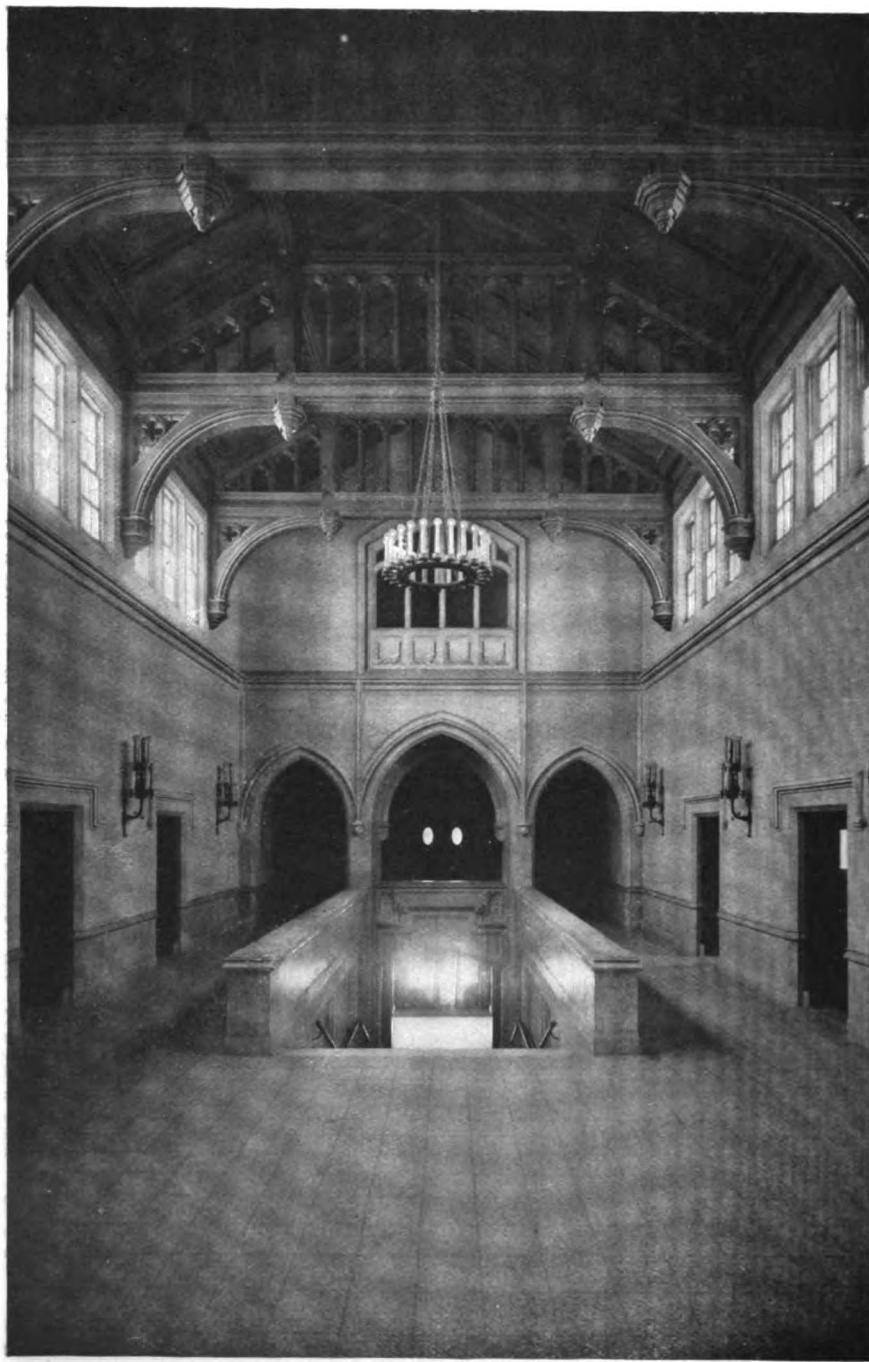
What we are accustomed to refer to with some pride as "American dentistry" is an importation of European dentistry, so far as its origins are concerned. Soon after the American colonies began to grow in strength and proportions sufficient to offer

American Dentistry Imported from Europe. an attractive field for dental practice, a number of peripatetic dental practitioners from Europe, with a view to bettering their fortunes, visited the colonies. In 1780 there came to America Joseph Lemaire, a French dentist, and James Gardette, also a French dentist holding a surgeon's commission in the French Navy. Both of these men were attached to the French Auxiliary forces under Count Rochambeau, and when the French forces were in winter quarters at Newport, during the last winter of the Revolutionary War, Lemaire and Gardette instructed in their art Josiah Flagg, a young officer in the Colonial Army, who, after the close of the Revolution, opened an office for the practice of dentistry in Boston. Thus it was that the dental art of France, which, at that time had reached a comparatively high degree of development, was transplanted to America, and Josiah Flagg, the pupil of the French dentist, Lemaire, has justly come to be regarded as the first dentist who received his education upon American soil. Both Lemaire and Gardette practiced for some time in Philadelphia, Gardette remaining in practice here until 1829, when he returned to France.

Profession of Dentistry Created in America. While the beginnings of dentistry in America were transplantations from both England and France, it is to the latter country that we are primarily indebted for the impulse which has created that distinctive system of practice based upon a specialized educational plan which later developed into the dental profession of modern times.

A distinguishing feature of dentistry during the first quarter of the nineteenth century was the commercial character of its ideal. Its proudest achievement was the ingenuity and manipulative skill of its craftsmanship both in the laboratory and the operating room.

The entire practice of dental art was upon a purely empirical basis, no means for systematic dental education existed, there was no dental



STAIRWAY AND UPPER HALL

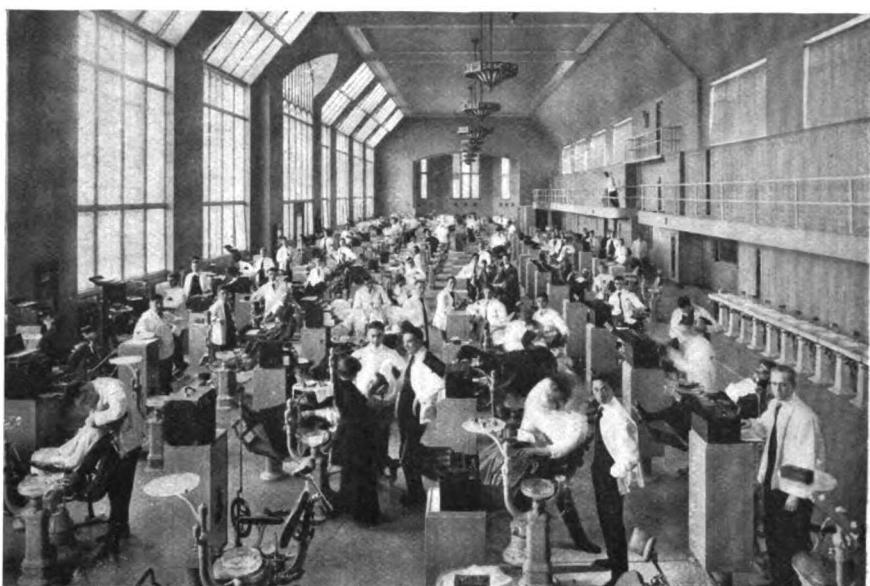
literature worthy the name and no professional organization. Practitioners of the art jealously guarded their modes of procedure as trade secrets are guarded at the present time. Professional intercourse in a general sense was not possible, owing to the jealousy which existed among practitioners, and because of the prevalent spirit of commercialism and the ignorance of the general public concerning dental matters, much charlatanism and quackery prevailed. That a spirit of commercialism should dominate dental practice in its earlier days was inevitable from the very nature of its service. The dental craftsman sold the product of his handiwork to the patient for a price. The character of the material employed and the amount of labor involved in the construction of the artificial restoration were the determining factors as to the size of the fee which the operator charged, and, so long as the remuneration of the operator was determined by the value of the material supplied and the amount of labor expended by him in its construction, and so long as the dentist was influenced by a consideration of these material values, he was necessarily dominated by a commercial ideal. It was precisely this atmosphere of commercialism prevalent among the earlier dentists that gave to their calling the characteristics of a manufacturing business, and subordinated, if it did not to a large degree obliterate, the professional ideal.

**Hayden
and
Harris.**

It was into such an atmosphere in 1839 that Horace H. Hayden and Chapin A. Harris, two men whose benefaction to dentistry easily entitle them to the highest place of honor in the Vallhalla of our immortals, came as the propagandists of a new gospel of professionalism in dentistry, which broke the shackles of commercialism and infused the spirit of professionalism into dental practice that is to-day bearing abundant fruit, and has given to dentistry an established place among the recognized professional callings.

By their united activities, they established in 1839 the Baltimore College of Dental Surgery, the first dental college in the world, the *American Journal of Dental Science*, the first dental periodical in the world, and the American Association of Dental Surgeons, the first national association of dentists in the world.

The College of Hayden and Harris, the mother of dental colleges, still an active and important factor in dental education, was successful from the start, and so manifestly did it reflect an existing need, that similar institutions were founded from time to time until, at the present, there are upwards of sixty dental educational institutions in the United States, each offering a curriculum of study which, in principle, is that devised by Hayden and Harris in 1839. The founders of the first dental college had seen with prophetic vision that in the future development of



OPERATING INFIRMARY



BACTERIOLOGICAL LABORATORY

medical science and art the mere increase in bulk of medical knowledge must ultimately divide the teaching and practice of medicine into separate specialties. Failing in their efforts to induce the authorities of the University of Maryland to provide facilities for the education of dentists, and confident of the reality of the need for dental educational facilities, they were compelled to accept the only alternative and establish dental education upon an independent and autonomous basis. Doubt has been frequently expressed as to the wisdom of this course; nevertheless, the growth of dentistry during the seventy-five years of its professional existence has furnished a sufficient justification of the wisdom of the pioneers who founded the first independent dental school. On the other hand, the growth of medical science in general, and the essential part which medical science played in the dental curriculum, made it necessary to include among the studies that must be pursued by the prospective dental practitioner practically all of those subjects of the medical curriculum which are fundamental to the whole science and art of healing. It has come to be necessary for the properly equipped dental practitioner to be well grounded in a knowledge of the structure, the composition and the functions of the human body both in health and disease, and to have an adequate knowledge of the means of therapeutic treatment of all of those diseases of the mouth and the associated parts which come within his province to treat. Moreover, the properly trained dentist must have a practical acquaintance with the surgery of the mouth and jaws, and he must be competent to do surgical operations that come within the field of his activities with intelligence and skill.

**Alliance
of Dentistry
and Medicine.**

In the evolution of both medicine and dentistry, so close have their relationships become that a considerable number of the medical schools of the United States and elsewhere have organized departments for the training of dental students who receive their instruction in certain of the medical branches concurrently with medical students. The great importance of dental education in 1867 led to its inclusion under the fostering care of the higher seats of learning. The pioneer in this respect was Harvard University, followed by the University of Michigan in 1875, and the University of Pennsylvania in 1878. The inclusion of the dental curriculum in the university plan of education is an important epoch in the history of dental professional education, in that it is an official recognition by the higher institutions of learning of the wisdom of the pioneers in dental education in establishing the dental profession upon a distinct and independent basis.

During the past twenty-five years the remarkable development which has taken place in medical science, particularly the flood of light which

has been thrown upon the causation of disease by the epoch-making discoveries of Koch, Pasteur and the group of scientists who have created the science of bacteriology, have brought forward problems in dental practice of the utmost importance, not only with regard to disease conditions of the mouth, but their connection with disease conditions in remote parts of the body. It is now a well-established fact that the mouth is the portal of entry for the majority of disease-producing germs that are the excitors of disease conditions in the body, and that an unclean mouth is an infected mouth which is a constant menace to the health of the individual. It is also well established that many obscure nervous disorders, cases of arrested growth, interferences with mental development, malnutrition, inflammatory lesions of the joints, valvular heart lesions, and many other bodily disorders, have their heretofore unsuspected origins in the unclean or diseased mouth. It has come within the province of dentistry to study these problems and not only to undertake their treatment, but by securing the maintenance of the mouth in a hygienic condition to prevent the occurrence of these disorders which have a mouth origin, and are, therefore, strictly within the category of preventable diseases.

It will be readily seen from what I have said that the scope of dental practice to-day is larger and more complex than it was seventy-five years ago, when the dental profession was first organized. It is for the purpose of preparing men to meet the conditions imposed by modern dental practice in all of its aspects that the educational plan, building and equipment of The Thomas W. Evans Museum and Dental Institute School of Dentistry, University of Pennsylvania, has been provided by a co-operative affiliation with the Board of Trustees of the respective institutions. "An arrangement which will secure to the students to be educated therein more fully and adequately than would otherwise be possible the advantages Dr. Evans intended to confer upon them."

The late Dr. Thomas W. Evans, of Paris, was **Thomas W. Evans.** best known in a public sense by reason of some of the more dramatic and outstanding incidents of his public life. His friendship with the late Emperor Napoleon III, his success in amassing a large fortune, his professional relations with European rulers which gave him access to nearly every court in Europe, the assistance which he rendered the Empress Eugenie by rescuing her from the mob in the Tuilleries and enabling her to escape to England during the trying times of the Commune in 1871, are well known. These public acts of his career have served to obscure the importance of his position and character as a representative practitioner of dentistry. Of humble origin, with no greater prospect of success before him than those

which apparently await any recent graduate in dentistry, he rapidly rose to a position of commanding influence as the result of his own efforts and indomitable perseverance, but notwithstanding his abundant material success, he never in all relations of life failed to acknowledge his allegiance to his profession, nor to use his efforts and influence for the elevation of its standards and to win for it that recognition from others of which he deemed it to be eminently worthy. In all that pertained to the art of dentistry he was ingenious and resourceful, and he was constantly on the alert for the discovery of useful ideas applicable to the exigencies of his practice.

The breadth and liberality of his mind in professional matters was a marked characteristic, and throughout his long and active career he emphasized both by his life and his writings the ideal of professionalism which was the governing motive in his work. He had long planned a benefaction for the profession that he loved, and in order to make it effective he provided in his last will and testament for the erection, at Fortieth and Spruce Streets, in Philadelphia, on the lot where formerly stood the house once occupied by his parents, of a dental educational institution, "to be conducted as such institutions of learning are now conducted in Philadelphia, and not inferior to any already established, fire and burglar proof and of artistic and refined beauty."

Fifteen years elapsed after the death of Dr. Evans before the benefaction of dentistry which his will provided could be materialized. What seemed to be interminable litigation over the disposition of his several bequests threatened for a time to defeat the carrying out of the major purpose of his will. Through the self-sacrificing patriotic devotion of the Hon. John Weaver, then Chief Magistrate of Philadelphia, and the gentlemen associated with him as members of the corporation legally chartered and empowered by the State of Pennsylvania to take over and administer the trust imposed by the will of Dr. Evans, and with the intelligent and unremitting help of Mr. Joseph W. Catherine and Mr. G. Heide Norris, the eminent legal counsel of the corporation, a settlement of the estate was finally effected, whereby the residue thereof became available for the carrying out of the benefaction of Dr. Evans to the dental profession through its educational activities. The residue of the estate representing material resources at the disposition of the corporation being insufficient to fully and effectively carry out the wishes of Dr. Evans as expressed in his will, a co-operative affiliation was arranged with the Trustees of the University of Pennsylvania whereby the resources of both institutions are made available for the end in view; an arrangement practically possible from the fact that the aims of both corporations with respect to dental education are identical.

The magnificent structure, with its unequalled equipment, which to-day we dedicate to the uses of dental education, is the materialization of the specific request of Dr. Evans that the institution for which he made provision should be housed in a building "fire and burglar proof and of artistic and refined beauty." In its organization ample provision has been made for the three fundamental activities necessary to dental educational progress. First, the training of undergraduates in preparation for professional practice. Second, facilities for post-graduate instruction in the later developments of dental science and art, and third, opportunity and facilities for the prosecution of original scientific investigation in matters pertaining to dentistry. All of which is made practically accessible to any and all who are competent to take advantage thereof and profit thereby.

The science and art of dentistry has long since passed the stage of development where its ministrations consisted wholly of mechanical restorations. It has grasped and fully comprehends the ideal of the redemptive and restorative character of its work and to-day is keenly alive to the new responsibility which is confronting it as an important factor in the prevention of general bodily disease.

In the creation of this new centre of dental educational activity, its faculty realizes that the weight of responsibility imposed upon them bears a direct relation to the opportunity which the benefaction of Dr. Evans has made possible, the responsibility, as he himself expressed it, of "placing our profession on more commanding ground and making it better serve the generation in which we live." It is the re-dedication of the educational staff of the institute to that ideal, which must be regarded as not the least important factor in the dedication of this new building and the benefaction which it represents.

In view of the exalted purpose of him whose belief in the usefulness of his profession to humanity impelled him to make provision for this splendid benefaction; in view of the singleness of purpose with which all who have been concerned in working for its realization have sympathetically labored to a common end, and in view of the high ideals of those who constitute its teaching force may we not confidently expect that the Thomas W. Evans Museum and Dental Institute School of Dentistry, University of Pennsylvania, shall stand forever in the City of Philadelphia as the fruitful source of training of those who shall go forth from her walls equipped to intelligently combat the ills of humanity that fall within the province of dentistry to treat and to prevent. Such being her exalted mission, then so long as we are all loyal to the ideals

which she represents, the Evans Institute will be in a very real sense like that tree seen in the heavenly city of the vision of St. John the Divine:

"In the midst of the street of it and on either side of the river was there a tree of life which bare twelve manner of fruits and yielded her fruit every month; and the leaves of the tree were for the healing of the nations."

Address by Mr. J. Howard Mummery, M.R.C.S., L.D.S., of London, England.

Mr. Provost, President Weaver, Ladies and Gentlemen:

I regard it as a happy coincidence that this celebration falls on the anniversary of the birthday of George Washington, for as an Englishman I deem it a privilege to honor the memory and character of a man whom we have to remember was a British subject, one whom, though we may have differed with him in opinion, we must nevertheless respect for his honesty of purpose, his splendid attributes of character and his high attainments, which have endeared him not only to you, but to the world at large. I esteem it a great privilege to be present at this commemoration, and to convey on the part of the profession of Great Britain our warm greetings to our colleagues of the United States and our sympathetic appreciation of their noble endeavors and great achievement. In the pursuit of dental science, the methods adopted in America and in England have been perhaps a little different. Taken as a whole, it may perhaps be said with truth that while Great Britain has given more attention to scientific problems connected with the profession, the United States has been foremost in the application of scientific truths to practical purposes. While we think that America owes us something for the stimulus which we have given to questions of pure science, we certainly owe her a debt for the numerous improvements in technic of which we have fully availed ourselves.

No civilized nation will ever forget the greatest **Anesthesia.** debt of all which we owe to America, the first practical application of anesthetics. The discovery of anesthesia is a discovery which we can confidently say has done more for the relief of mental and physical sufferings, has been richer in benefit to humanity than any other human achievement. When we think of the awful dread which oppressed all those who met with a serious accident or suffered from a surgical disease, and the terrible agony of a capital operation in former times, we cannot be too grateful to the nation which removed this nightmare from the world. That memorable meeting in Paris, when the monument to Horace Wells was unveiled, had, we think, more significance to humanity than similar, much greater celebrations in

honor of heroes whose valor in war has won the recognition of the world.

The appreciation of our obligation to American

W. D. Miller. dentists would be altogether incomplete without specific reference to the great and important results to the profession on the scientific side from the life work of that great man, Willoughby Dayton Miller, a graduate of your institution of the class of 1879, a man whose name is held in reverence by the profession throughout the whole of the civilized world. I may be perhaps permitted to say that he was the most valued and dearest professional friend I ever had. His delightful enthusiasm was a stimulus of the greatest value, and I owe him a debt of gratitude never to be forgotten; his suggestions and help in my own work have been invaluable. His characteristic American enthusiasm and quickwittedness, combined with the thoroughness and accuracy of the methods which he adopted from the country in which he took up his abode, made a combination which succeeded in bringing him into the first rank of scientific investigators.

It has been recently said that, after all, scientific investigation has led only to the perfection of means for destruction of human life, but this is only another of the fallacies that have been begotten of our present disturbed situation, for it is demonstrable that the practical applications of science have actually saved more human lives than the total number which have been lost in all of the wars of the centuries.

Science, after all, as Professor Huxley says, "is simply trained and organized common sense." As distinguished from results obtained solely by experience, the causes leading up to such results being but little understood or distinguished, our outlook for the ultimate success of the profession of dentistry is dependent upon the recognition of this principle. From the point of view of the dental profession, it is a matter of rejoicing that this great institute is to be administered in this spirit; that its governing motive and mission is to translate the unknown into terms of the known; to be the creator as well as the transmitter of dental knowledge, and to make the scientific in dentistry the foundation of the practical.

**Evans
Dental
Institute.**

By reason of the happy affiliation of the resources of the Evans Institute with the educational activities of the University of Pennsylvania, there has been made possible a practical realization of the desire of Dr. Evans to confer a benefaction upon his "beloved profession," as he expressed it, more fully and adequately than would have been possible under any other circumstances of which we can conceive.

In this institution the profession has, for the first time, both in material and in its organization, secured ample provision in connection with its educational activities for the prosecution of investigation in pure science. Science does not work with utilitarian ends in view. It is pursued without reference to results. As Professor Huxley says, "The physical philosopher, in the course of his investigations, lights upon something which proves to be of practical value. Great is the rejoicing of those who are benefited thereby, and, for the moment, science is the Diana of all the craftsmen. But even while the cries of jubilation resound, and this flotsam and jetsam of the tide of investigation is being turned into the wages of workmen and the wealth of capitalists, the crest of the wave of scientific investigation is far away on its course over the illimitable ocean of the unknown."

Address by William Simon, of the Baltimore College of Dental Surgery.

Mr. Provost, Ladies and Gentlemen:

To me has been assigned the task of speaking briefly on the subject of "The Birth of Dentistry as a Profession." It would not be justifiable to discuss similarly the birth of medicine or of any other profession, because they were not born; they were the result of an evolution extending over periods of centuries.

It is entirely different with dentistry, as this branch of human knowledge and human activity came into life as a profession quite suddenly. The year 1840 must be designated as the one in which the child was born. As late as 1838 an English dictionary (Tail's Mag. V. 197) defines dentistry as "a calling growing into a profession," which clearly shows that at that time dentistry was as yet not looked upon as a profession actually in existence, but as one yet in an embryonic state.

Of course, more or less successful attempts to relieve suffering humanity from the tortures of diseased teeth have been made not only for hundreds, but for thousands of years past. It was most likely old Egypt to which we should look as the cradle of dentistry as a distinctive branch of the healing art. But even during the century preceding the arrival of the profession of dentistry the caretaking of diseased teeth was largely in the hands of ignorant, uneducated and unscrupulous persons.

Yet during this period we find men who, through their superior skill, their painstaking care and intelligent interpretation of existing conditions, stood far above the average dental manipulator of those days. Some of them had laid the foundation for their dental knowledge under the tutorage of other practitioners, while most of them were self-taught, there being neither schools nor much readily accessible literature to assist anyone desiring to take up the work of the dentist.

Although the study of the diseases of the teeth should have formed part of a physician's education, the medical schools gave practically no instruction pertaining to this subject. Indeed, the medical practitioners of those days looked rather contemptuously upon those who performed any kind of dental operations.

These sad conditions were fully understood by those few prominent men who recognized that much good might be accomplished by proper dissemination of dental knowledge through the three principal channels open to us, viz.: (1) Through personal contact of the parties engaged in the common field of labor, *i. e.*, through exchange of thought and experience in association meetings; (2) through literature, especially when in the form of periodical journals; (3) through proper theoretical and practical instruction given at well-appointed institutions.

The thought that these means should be employed no doubt had been in the minds of many, but it lacked the leadership of some powerful mind to gather the scattered forces, inspire them with enthusiasm and set in motion the machinery through which the desired result might be obtained.

Fortunately, the right man, or, more correctly speaking, the two right men, appeared just at the right time to lay the foundation for the cornerstone upon which the profession of dentistry could be erected as a new but great and powerful factor in the well-being of humanity.

**Hayden
and
Harris.**

The men who became the leading spirits in this noble cause were Horace H. Hayden and Chapin A. Harris. To these men the dental profession, as well as the people of the whole civilized world, owe everlasting gratitude. They stand out prominently and conspicuously as intelligent, energetic, far-sighted and unselfish men, willing and ready to give freely to others their knowledge and experience and to do so cheerfully even at a personal sacrifice.

Though Hayden was a native of Connecticut, while Harris was born in the State of New York, these two remarkable men came together during the early part of the last century in Baltimore, where both had located as dental surgeons.

**First
Dental
Society.**

The thought of bringing together the better class of dental practitioners by forming a national dental association had been in Hayden's mind long before this society became a reality. However, it was not until August 18, 1840, that a number of prominent dentists assembled in New York City and founded the "American Society of Dental Surgeons," of which Hayden was chosen first president, continuing in that office until his death.



The second step in the formation of a dental profession was taken almost simultaneously with the first one. It was the founding of a journal having for its object the advancement of dental surgery as a science and as a profession.

Association was formed in New York for publishing this journal, and was named *American Journal of Dental Science*, and appeared in several issues. While the name of Dr. Hayden does not appear in the number of the journal, it is generally recognized that it was his mind that had pushed matters to a successful realization of one cherished dreams. Dr. Harris was a frequent contributor to the journal in the first year, and became chief editor in the year 1850.

profession cannot live, grow and develop unless its ranks are strengthened by the infusion of new blood, *i. e.*, through the admission of new members who have been well trained to carry on the work. In other words, there must be some school through which the existing constantly growing knowledge pertaining to the respective profession can be imparted to others.

Both men, Hayden and Harris, fully realized the importance, the absolute necessity of dental education. Strong efforts were made by them to induce the University of Maryland to found a dental chair, and thus add dental instruction to the medical course. Their efforts were in vain. In a letter from the University to Dr. Harris, it is said that the unfavorable action of the faculty was justified "the subject of dentistry being of small consequence!" How little the medical men of that time understand the intimate relationship between the function of healthy teeth and the well-being of the human body!

Personally, I have always looked upon the refusal of the University of Maryland to establish a dental chair as a rather fortunate incident. As an appendix to medical education, dentistry for probably a long period would not have derived the same recognition which came to it by founding the separate college as a branch of medicine, but upon an autonomous basis.

An independent dental school now having been decided upon, on the 22nd of February, 1840, the Legislature of Maryland passed an act for creating the new institution under the name of "The Baltimore College of Dental Surgery."

The incorporators were, besides Hayden and Harris, two physicians who had been selected to act as professors of the more strictly medical

In the charter we find in print for the first time the degree of "Doctor of Dental Surgery," which, after many discussions between the founders, had been decided upon, and which title since that time has been conferred by the first school and by other colleges which quickly followed, upon thousands and thousands of worthy men, who through their labors have benefited the human race in all parts of the world.

From the day of its birth the institution was a complete success. For three-quarters of a century this, the oldest dental school in the world, has carried out faithfully the plans of dental education as conceived by its founders.

I realize, Mr. Provost, the honor you have bestowed upon me this day in inviting me to act as spokesman for this institution, from which I am also the bearer of good wishes and of hearty congratulations on this momentous occasion of the opening of the Evans Dental Institute. Seventy-five years ago the foundation stones for the profession of dentistry were laid, and in the course of those years a powerful organization has been built up. To-day a mighty tower of strength has been added to the edifice in the institution which begins life this day.

May the searchlights of this tower penetrate to unknown fields of labor; may they reveal new facts, new conditions, new methods which may serve to shed additional luster on the art, on the science and on the profession of dentistry, and bring new blessings to humanity.

The Late Thomas W. Evans.

Thomas W. Evans, the founder of the Thomas W. Evans Institute, was born in Philadelphia, December 23, 1823, and died in Paris, France, on November 14, 1897, shortly after his return to Europe after a brief visit to America. As a boy he lived with his parents in the house which stood on the lot at the northwest corner of Fortieth and Spruce Streets, where the new building now stands as a permanent monument to the great American dental surgeon. He was the youngest of three sons, Rudolph, Theodore, and Thomas, the subject of this sketch. He was educated in the common schools of Philadelphia, and at the age of fourteen entered the employ of Joseph Warner, a gold and silversmith of Philadelphia, whose business included the manufacture of certain surgical instruments, and incidentally of plate, solders, and some of the implements used by dentists. His apprenticeship with Warner brought him into occasional contact with dentists of that period and their methods, and in that way he no doubt derived the impetus which led him later to enter upon the study of dentistry as a profession. In 1841 he became a

student in the office of the late Dr. John DeHaven White, of Philadelphia, with whom he remained for two years. During his studies with Dr. White he attended lectures at Jefferson Medical College, from which, in due course, he was graduated.

He practiced his profession for a time in Maryland, and later, in partnership with Dr. Philip Van Patten, at Lancaster, Pa., with whom he remained until 1847. It was during his stay in Lancaster that Dr. Evans performed a series of gold contour filling operations, which he exhibited at the annual exhibition held under the auspices of the Franklin Institute in the fall of 1847, for which he received a gold medal in recognition of the novelty and merit of his work. Dr. C. Starr Brewster, an American dentist practicing in Paris, had his attention called to this work done by Dr. Evans, and was so impressed by it that a partnership was arranged between them.

The partnership between Drs. Brewster and Evans lasted until 1850, during which year Dr. Evans opened an office on his own account in the Rue de la Paix, and entered upon a professional career which was as wonderful as it was unique.

Although Dr. Evans was not the pioneer American dentist in Europe, he brought to Europe a combination of personal characteristics and special technical ability which not only made him a conspicuous figure, but gave an impetus to dental practice and a status to its representatives before unknown.

Dr. Evans as an operator may have had many peers, and in recent times many who excelled him as a practitioner. There are not wanting those who place but light estimate upon his abilities as a dentist, and who attribute his phenomenal success to abilities quite apart from his skill as an operator. There is, however, evidence tending to show that he was an operator of more than usual ability.

His professional equipment in itself cannot be regarded as the cause of his phenomenal success. His abilities as a practitioner were merely a contributing factor in a complexus of characteristics which have helped to make Dr. Evans the most conspicuous figure connected with dentistry. Dentistry became to him the stepping-stone which served as a means of bringing him into contact with those to whom he made himself of value and who contributed substantially to his success. He was a born diplomat, possessing a keen perceptive faculty which enabled him to read and correctly understand human nature, delicacy and firmness in his treatment of affairs, a rigid honesty of purpose, and a foresight which was intuitive. In short, he knew how to make the best of his opportunities, and in some degree create them. His association with Dr. Brewster brought him into contact with the aristocratic element of French

society; it was his avowed ambition to secure for his clientele all of the crowned heads of Europe, and it has been asserted that in this he succeeded. By his skill and attractive personality he drew them to him and won their confidence. His confidential relationship with Napoleon III has become historical, and its two most important results—namely, the diplomatic mission intrusted to him by Napoleon to President Lincoln during the war of the rebellion, which resulted in the neutrality of France with respect to that issue, and the aid rendered by him to the Empress Eugenie in her escape to England during the riots following the fall of Sedan at the close of the Franco-Prussian war—are matters of common knowledge.

It has been stated that Dr. Evans owed his fortune to the patronage shown him by Napoleon III. This is not wholly true. It is a fact that the doctor's reputation was greatly enhanced by the confidence of the French Emperor, and that his list of patrons was greatly enlarged as a result, but by far the greater portion of his accumulated wealth was due to the real estate investments made possible through the personal friendship of the Emperor.

Much of Dr. Evans's life was devoted to work of charity and philanthropy. He rendered important service during the Crimean and Franco-Prussian wars in the care of wounded soldiers, and in introducing more sanitary and humane methods in military hospitals. Sent by the Emperor at his own suggestion during the Crimean war to study the sanitary condition of European camps and hospitals, he was so impressed by the pictures of misery and suffering there presented to him that on his return he secured the interest of the civilized world in important measures of reform. His record during the late Civil War in the United States will be found in the history of the United States Sanitary Commission, which he organized in Philadelphia, coming over especially to serve his native land in the hour of need. During the Franco-Prussian war he was probably the only man in Europe who might pass from camp to camp. During all this memorable campaign he personally directed the movements of the ambulance corps of the Red Cross Society.

It was the elements of character which led him to undertake such work, and the associations which it made for him that more than all else contributed to his reputation and material success. Throughout his whole career he never forgot, and, indeed, constantly emphasized, two facts: that he was an American and that he was a dentist. In his loyalty to his profession he was steadfast; his faith in its possibilities was unfaltering; he was always the champion of high professional ideals. The principles which animated his professional life he manifested from the beginning of his work, and were in marked contrast with those of many



early confrères. In a communication written soon after he located
s he said: "I may have but little to impart, yet that little is at the
of each and all members of my profession; and gladly would I
e day that should make all that is sound in science and valuable
common property. . . . By the discussion of subjects connected
ur profession, and by the contribution of each according to his
by the comparison of the different modes of practice and the
known all new discoveries and improvements, we shall place the
ion on more commanding ground and better serve the generation
ch we live."

at his professional life was lived in harmony with these principles
ults show. The measure of success which he attained was not
to material acquisition, but was extended to the elevating influence
he exerted upon the general status of his profession. He lived
his chosen calling placed upon more commanding ground, and the
f its ministrations to his generation substantially recognized.

that his life-work was a large contributing factor to that end cannot
bted, and when all of the factors which have helped in the ad-
ment of the professional status of dentistry are fairly estimated,
uence of the life of Thomas W. Evans will be among the greatest.





American Society of Orthodontists.
Discussion of Dr. Woodruff's Paper,*
The Causes of Abnormalities, Heredity or Environment.

Dr. James B. Morrison. It has indeed been a privilege and pleasure for me to have had this paper in my possession for the last two weeks. It has long been a vexed question as to the part which heredity and environment play in malocclusion, and it is most opportune that this society should have presented such a wonderful assembling and sifting of the most advanced thoughts on the subject. I can sympathize with those present who hear this paper read for the first time, as it is something to sit up nights over and study, and I have read it with increasing interest many, many times. Although not presuming to discuss it fully, there are some points I would like Colonel Woodruff to make clear to me. There are many of us who through close application to practice draw our conclusions from clinical evidence, and as one of these I am a believer in the direct inheritance not only of subnormal development, but of peculiar characteristic malocclusions. However, this theory has been set up and knocked down and set up and buffeted about to such an extent that I am exceedingly anxious to get support for it. I have naturally read this paper, looking for this support, and although there are conclusions which point to it, I find that the working of heredity and environment are so intricately associated that it is very hard to say where one ends and the other begins, or whether they do not work harmoniously together in the multitude of changes, good and bad, which have brought about the present condition of the human species. I understand from the paper that the germ plasm is affected in intra-uterine life by the environment, and that the changes

*Dr. Woodruff's paper was published in the February issue.



effected will or can be transmitted to the progeny; but that mutilations of the body of the parent are not transmissible. And I quote this extract from the paper: "The great advantage of Wiesmanism is the way it settled the baseless idea that a modification of the body so influenced the germ cell in the ovaries and testicles that they would develop into a body possessing the same anomaly."

Now this is a point upon which we as orthodontists have conflicting evidence. I feel sure that all of us here can recall cases where there had developed malocclusion, which bore a marked resemblance to conditions which existed in the parent, and

**Clinical Evidence
of Transmitted
Abnormalities.** although these are attributed to like conditions affecting development, I have seen them too often and of too striking a character to consider them anything else but the transmitted result of tissue change in one or both parents.

It is rather harder to believe that mutilations of the parent can affect the child; but clinical evidence is again very conflicting, and although I do not find or think that mutilation of the adult will affect the offspring, mutilation such as the removal of teeth of the child during the early developing period of the jaws will affect their offspring. The exact transmitted effect of early removal of first permanent molars is rather hard to trace and isolate, being associated with under-development, which it naturally causes; but the removal of anterior teeth presents a more characteristic and localized effect. I have here the casts of teeth of two children whose mother had the left upper permanent lateral extracted in childhood. I have also casts of the children's teeth, and I am sure we all have, where a canine of the parent had been removed in childhood, and there is a peculiar characteristic lack of development of the alveolar tissue in the canine region, making a pronounced malocclusion inevitable.

These conditions of development, to my mind, are more than coincidences, and point to the vital importance of recognizing the effect on posterity of conditions which exist and influences which affect the development of the child, whether it be light, heat, malnutrition, disuse of organs, or mechanical interferences in the development of the alveolar tissue by the removal of teeth. Dr. Woodruff has aptly said that the subject belongs to preventive medicine.

I do not know how the majority of this society feel in regard to heredity in relation to orthodontia, but can we not give as the principal cause of malocclusion the accumulated result through generations of lack of use of the teeth, and the mutilations previously referred to? If this is the case, is there not a tremendous field for preventive orthodontia, and is it not time to make united efforts? I am obsessed by a feeling that

scientific research is often at variance with clinical evidence; but I hope this is nothing more than an obsession. We know that many observations in medicine and dentistry have been disproven by scientific investigation, but even the ultra-scientific disagree, and after all, the one must corroborate the other. This is why I feel that it has been such a splendid thing to have this paper. We must get together on this subject. The laboratory investigator and the clinical observer must help one another.

I agree with everything Colonel Woodruff has

Dr. Martin Dewey, said and openly disagree with the gentleman (Dr. Morrison) who opened the discussion. There is no

questioning the fact that we find malocclusion of the teeth in children sometimes, where there has been malocclusion in the parent, and if we go back and investigate the surroundings, we will find these conditions have always been the result of some environment. It is a fact, that under certain conditions, as in the case of bacteria and plants, the character of the germ plasm may change, and you will develop a new species, almost. You can often do it in a very gradual manner. Our attention has been called to the fact that blonde races, by conditions of environment, may be changed to brunettes, because they are more able to exist in some localities. You can take certain plants under one environment and by changing the conditions produce entirely different plants. For instance, in California, Burbank has shown that certain plants that grow near the sea-coast are influenced by the wind and grow large cilia, but farther away from the coast that development of cilia does not occur. A plant under unfavorable environment will develop these cilia and they are transmitted in that locality. Change the locality and that disappears. This shows the close influence of environment upon the germ plasm in that particular locality. As the result of transmission of certain characteristics, we have had before the society the question of the bull-dog, which one of my friends always brings up. Certain characteristics of this animal are produced by inbreeding and selection. We also note the disappearance of certain characteristics when you cross a bull-dog with any other breed, showing that the character which is of no particular advantage is the first to disappear.

I was also glad to hear what Colonel Woodruff had to say in regard to the effects of inheritance on degeneration, the effects of environment upon criminals, because I have had occasion to discuss that question many times. Criminals reproduce themselves because they live in a favorable environment to raise criminals. We must consider the question of variation which is always occurring. If you take a dozen people you will find a certain number of them of average height. A certain number are short, and a certain number long or tall, but if you make



an average you get the same height. If you intermarry these short people with tall people, or tall people with short people, they will produce various kinds of progeny. If a tall man be at a disadvantage in that particular locality, the tall man would necessarily disappear. Malocclusions are a decided disadvantage. The reason a deformed limb cannot be transmitted to the offspring is because the normal is always produced.

As regards malocclusion, I have called your attention to the fact before that the deciduous teeth are nearly always in normal position. You have normal occlusion. If you do have malocclusion of the deciduous teeth, it can be traced to some result of environment; that is, in the child the deciduous teeth develop early in intra-uterine life and to a great extent develop in a normal condition, but from the time the permanent teeth begin to erupt, or from the birth of the child the permanent dentition of the child is the result of environment, as improper feeding, improper development, improper living, improper breathing, all of which tend to produce malocclusion.

There is no evidence to support the theory that malocclusion is ever inherited. There is no evidence to support the notion that the large teeth of one parent and a small jaw of the other can occur in the offspring. If they do occur, you will find just as many large teeth as small jaws. You will find just as many large jaws with small teeth as there are large teeth in small jaws. If it works one way, it will have to work the other.

I am naturally much pleased with Dr. Woodruff's paper because it lends so much support to my own view, which is that mutilations and malformations are not inherited.
Dr. R. Ottolengui, **New York.**

We are handicapped in our studies of inheritance as related to man, because the individual lives so long. It is much simpler to study the transmissions of characters in the lower animals and plants, because the complete cycle of a generation is so much shorter. It is interesting, therefore, to study and consider these phenomena, as possibly correlated with seemingly similar occurrences in the lives of human beings; yet we should not too quickly accept as proven, that what occurs in vegetable life or with the lower animals, would likewise hold true with human beings.

However, as heredity has been discussed from the standpoint of facts related with bacterial and plant life, perhaps you will pardon my speaking of the lower animals and insect life.

Dr. Woodruff spoke of blondes, blue-eyed races, and deaf-mutism. There are some peculiar and interesting facts in relation to these points to be found in the histories of the domestic feline.

**Congenital
Deafness.**

It is practically an unknown occurrence for a cat to be born deaf, except blue-eyed, white cats, and with these, congenital deafness is so common that when the contrary occurs the dealer advertises: "Blue-eyed, white cat for sale; sound hearing." Yet the yellow-eyed, white cat has sound hearing. If a yellow-eyed white cat be mated with a blue-eyed, white cat, those in the litter having blue eyes will be deaf, while those with yellow eyes will have sound hearing. Here is another very odd fact. If blue-eyed, white cats be mated together the blue color fades more and more with each breeding, but if a yellow-eyed mate be introduced the progeny having blue eyes will have the blue of a deeper color. Thus breeders when trying to produce white cats with beautiful blue eyes are compelled to utilize a yellow-eyed stud, even though this results in some yellow-eyed kittens which are of little value. Now observe that in this mating we have two blue eyes in one animal and two yellow eyes in another. But the finest blue-eyed, white cats in this country have been produced from a pair, each of which has one blue and one yellow eye, known as odd-eyed cats, for which reason they are barred from the cat shows. Yet their kittens have won dozens of prizes.

Sports.

You all have heard of the tortoise-shell cat, but it may be new to some of you that the tortoise-shell is really a "sport," and is always a female. Thus the production of a tortoise-shell cat in the highest perfection is most difficult, since there are no males. The tortoise-shell then is either produced by mating a blue cat with an orange tabby, the litter perhaps containing one or more blue tortoise-shell kittens; or what is preferred, mating a fine black with an orange tabby, which produces the most brilliant coloring. In England there is the history of a great prize winning tortoise-shell, that was mated with various sires with the following remarkable results. Mated with a black, the entire litter was black. Mated with a blue the entire litter was blue. And mated with an orange the entire litter was orange. What would have occurred had she been mated with a white, a brown or a silver I do not know, but it was not deemed wise to carry the experiment beyond the three colors naturally connected with the tortoise-shell. The interesting fact was that the mother, herself a "sport," did not reproduce a "sport" like herself in three litters. This I think is a fairly good argument against the transmission of anomalies, and in favor of the adhesion to type. Be it remembered, too, that the cat is a mammal.

**Effect of
Diet.**

We have the exact analogy to this in insect life. You all are familiar with the large black and yellow, swallow-tailed butterfly, common along the entire Atlantic coast. Its name is *papilio turnus*. There is

a variety called *glaucus*, which is analogous with what I have told you of the tortoise-shell cat. The male of *turnus* is always black and yellow, really yellow with black stripes. In New England the female is orange and black, and is known as the typical *turnus* female. In the Carolinas and southward, however, the female is black, and is called, variety *glaucus*. To test the question as to whether these were two different species with similar males, or a single species with two forms of female, Prof. Smyth, with the aid of a New York correspondent, made experiments. He collected eggs from *glaucus*, the black female, and sent them North to be reared. They were fed on the plant which the caterpillar eats in that locality, and out of a hundred specimens, every female was the true orange or typical *turnus* form. Some of these were mated with native *turnus* males, the eggs divided and half returned to Smyth. All the eggs reared in New York produced typical females, while all those reared by Smyth produced *glaucus* females. Both men again mated females and divided the eggs. The question now was to determine whether it was climate or food which produced the *glaucus* form. Therefore the eggs in each locality were fed half on the northern food plant, and half on the southern, and in each instance all that were fed on the plant common in the South produced the black or *glaucus* females, and those fed on the northern food plant produced typical orange and black females. This, I think, definitely proved that the *glaucus* or black "sport" was for some odd reason due to the food plant. Why the *glaucus* form is never a male, and why the males should not be affected by the food plant, are seemingly an unsolved and perhaps an unsolvable problem. But these facts show at least how difficult it is to actually pierce the mystery of heritage. When the females are so totally different, dependent upon the food, it is strange that the diet should have no effect upon the males.

**Effect of
Cold.**

Though I fear that I am speaking too long, may I touch on the question of environment? There is another common butterfly, *vanessa antiopa*. The wings are of a mahogany brown with an orange and a blue strip at the extreme outer borders. A man in New Jersey collected several hundred of the pupæ of this butterfly, and placed them in a refrigerator. At definite intervals he would remove a stated number from the refrigerator, keeping them thereafter at room temperature. When all the imagos had emerged, it was found that the blue and the orange had faded away or disappeared entirely, just in proportion to the time that the pupæ had been exposed to the icy temperature.

**Effects of
Locality.**

There is a very beautiful sphinx, *triptogon modesta*, fairly common in New England, which is dark, mouse-colored gray. A similar creature, though rather larger, was taken in California, and

is a pale, creamy color. The collector named it *triptogon occidentalis*. In my own collection I have a series taken from New York to California in various States between the two coasts, and as we go West we find the dark gray color gradually changing to the light cream, apparently showing that the color depends upon climate, or food, or both; at all events upon environment.

Hybrids have also been produced in insect life.

Hybrids.

Attacus cecropia, the largest of our American moths, sometimes called the American silk worm moth, will mate with any of its congeners, *attacus columbus* in Canada, or *attacus gloveri* or *ceanothi* from the West. Oddly enough I have never seen a hybrid of any two of the other three, but I have hybrids of *cecropia* with all the others. In every case it is perfectly easy to determine which species was mated with *cecropia* to produce the hybrid, the progeny being a symmetrical suffusion of the markings and coloration of both parents.

As bearing upon what Dr. Woodruff said of accidents during intrauterine life, let me relate a remarkable experiment with this same moth, *cecropia*, which was made by a Columbia professor whose

name, I regret to say, escapes me. He took numerous pupæ of *cecropia*, and froze them hard enough so that they could be divided with a razor without allowing their fluid interior to move. Some he divided horizontally, and others vertically. He then applied the one-half of a male pupa to the similar half of a female pupa. These divided pupæ reunited, and developed to the imago stage, the progeny being half male and half female in form, a result which I think was as astounding as any experiment ever reported in so-called plastic surgery. The males and females of this moth are easily distinguishable, both by their pattern and coloration, and also by the fact that the antennæ of the male is very much larger and coarser than that of the female. Thus the pupæ, which had been divided vertically produced moths with a male antenna and wings on the right, and a female antenna and wings on the left side. Where the incision had been horizontal, the upper wings were those of one sex and the lower wings and body those appropriate to the other. Thus we may say that hermaphroditism was here produced surgically, the operation having been performed on the pupæ, which is between the larval and the imago stages.

In passing this it is worthy of note that whereas many of the large collections (notably that made by Strecker) show specimens of hermaphroditism, specimens of hybrids are almost never found in nature; indeed I do not know of an instance that could be called authentic, excepting the single instance of a European female sphinx, which was tied



to a tree during the night, by a Brooklyn collector, and was found mated with a congeneric American spinx, the resultant eggs producing an imago, the underside of which resembles the American, while the upper sides of the wings more closely simulate the European. Yet even here, at least one of the individuals was in captivity. The point I wish to make is that all hybridization of this sort known to me have been produced by man's intervention and not by untrammeled natural selection.

**What is
Type?**

We talk glibly of type, and of the persistency of type. How are we to determine just what is typical in man? What race or tribe is there in the whole human family that is not an admixture, with the possible exception of the Laplanders and the Fuegans? What is type? In entomology, when a man names a new species, he pins a label upon the specimen used for the description, and labels it "Type." This, of course, is an arbitrary rule. Harry Edwards, the great actor and equally great entomologist, once named a moth from Colorado. He had hundreds of specimens before him, varying from almost solid brown with a few cream-colored splotches, to almost all cream with a few brown markings. He made a series of ten pairs, all different as to individuals, but grading from one extreme to the other, and he labeled the entire set, "Type." Was he not right, and is it not much the same with humans?

**Transmission
of Malocclusion.**

Dr. Morrison builds an argument on a single instance where two children had a lack of space in the same region as the mother. What will he say of the following case? I had a child with the lower left bicuspid in contact with the lower lateral. The mother had the temporary cuspid retained in the same locality. I radiographed the mother, and the missing cuspid was congenitally absent, but when I radiographed the daughter the missing cuspid was present. Note that the congenital absence of the cuspid was not transmitted.

In another of my families there are twelve children. With identical ancestors, should we not find some similarity in the malocclusions, if malocclusion can be transmitted? Both parents have slight aberrations from the normal, no more. The first born, a girl, had a practically normal occlusion. In those of the others who have developed permanent teeth there are various degrees of malocclusion, including two cases of Class II, Division 1, and one of Class II, Division 2. None of the malocclusions resemble each other or the parents in any marked degree.

But, of course, isolated cases prove nothing; neither where the malocclusion are similar or dissimilar. The last case is of interest only because there were so many children.

**The Jukes
Family.**

All who disbelieve in the influences of environment should read the history of the Jukes family, to which Colonel Woodruff has alluded. This family was practically segregated for several generations, and there was every grade of degeneracy, including criminality in the males, prostitution among the females, and alcoholism and pauperism among both. Yet this great truth was discovered, that whenever a Jukes man escaped from his environment, went and lived at a distance from and away from communication with his own people he ascended the social scale. Likewise when a Jukes woman married a normal outsider and changed to the environment of her husband she lived a more normal life. In conclusion the optimist must continue to hope that mutilation, deformities and degeneracy of all kinds, are not transmissible; that there is always a tendency towards the highest type. Otherwise the future of the human race would be hopeless indeed.

I would like to ask Colonel Woodruff a question
Dr. F. G. Kempler, in regard to deaf-mutism. As I understood him, he
New York City. made the statement that deaf-mutism is persistent; that it is a permanent and transmissible characteristic. It just happens that I know of a few deaf-mutes whose parents were apparently perfectly normal. They had three children, and two of them were congenitally deaf. I know of other mutes where the father and mother are both mutes, and their children are apparently perfectly normal children, bright and active. I just wonder what percentage of exceptions there might be to the rule.

Colonel Woodruff is a very great puzzle to me. I have been studying (closing). it for twenty years, but I find one generalization.

In Japan I found that those who live in cities are very prone to arrest of development of the jaw and malocclusion in very bad form. In China I found the same thing. The great, splendid specimens of Japanese wrestlers and acrobats, are all countrymen so far as I know.

I was very much struck in London two or three years later to find an enormous number of these deformities among the city people, and so far as I could see they were much fewer on the farms. I have found a great many in this country, too, and there is something injurious in the abnormal environment of city life which is not what we are accustomed to by Nature. A cause may be the bad nutrition of the city people as compared with those of the country. The well-to-do in the city live very much better than those in the country. Nevertheless, in New York State, the death rate in the country districts is greater than in the cities. They have many deformities, too. Their tonsils are enlarged, they have adenoids and bad teeth. Children are overclothed in the summer and under-

clothed in the winter. They are overheated in the homes and sent out perspiring. I have an idea that the bad methods of living have something to do with the remarkable fact of deformities of the lower jaw being so common. Whether it is hereditary or not, I think, depends upon the definition we make, and also whether it is a temporary or spurious heredity which lasts a certain number of generations.

Some remark was made about blondes changing to brunettes. That never occurs. Blondes disappear by higher mortality. You have never yet seen a blonde race change into a brunette one except by the very long, drawn-out process of survival of the fittest.

In regard to white cats, they are more or less albino, and are somewhat degenerate. The albinos, I mentioned, have poor resistance. The sight of the albino is very poor. They are affected by too much light and are short-lived, and they transmit this defect in accordance with Mendel's law.

If we look into the question of transmission of characters by mating between different kinds of cats, we will find they follow Mendel's law. I cannot say definitely about the cats which Dr. Ottolengui mentioned, but I think they follow Mendel's law.

As to butterflies showing the effect of environment, it has been proven that certain insects change from one climate to another. If the environment changes and they happen to be better fitted for that climate they survive. There is a certain butterfly which is dark in cities and light in the country, and it has been increasing in numbers as cities have increased in size and number in Europe, and this has something to do with the increasing brunetteness of cities. Blondes disappear from cities unless they live in the suburbs. If you take any city and go from the congested districts outward, you will find an increasing proportion of blondes, because they have instinctively known how to take care of themselves.

With regard to deaf-mutes appearing in normal families, that is a case of a recessive character reappearing. Characters may be recessive for several generations, and then appear upon mating of the proper kind. Deaf-mutism, polydactylysm, albinism, and everything of that sort will appear sometimes after several generations.

Correction.

We regret that some errors occurred in the article by Dr. Milo Hellman which appeared in our last issue. Figs. 5, 6 and 7 on page 168 should have been numbered 8, 9 and 10, whilst the figures numbered 8, 9 and 10 should have been numbered 5, 6 and 7. Fig. 12 on page 171 is inverted. The word "constructed," on page 177, seventh line from the bottom, should read "constricted."



Dentistry in Public Institutions.

By DR. FREDERICK A. KEYES, Boston, Mass., Superintendent of Dental Clinics, St. Vincent's Orphanage.

Read before the Second District Dental Society, January 1915.

Dr. Hyatt's invitation to address this meeting on dentistry in public institutions pleased me greatly. Although three weeks is a rather short time in which to obtain full material for a subject of such gigantic proportions, nevertheless I selfishly decided that to be present at one of the meetings of this society would be most instructive, even though I imparted to you no new ideas upon this matter.

Institutional Dentistry is a term which I have been using in Massachusetts for the last four or five years. This term, however, is a misnomer; for I make bold to say that with few exceptions there is no such thing as systematic dentistry in our public institutions. I proved this to my own satisfaction in the following way. After a careful perusal of the Thirty-fifth Annual Report of the Massachusetts State Board of Charities, which contains a full report of all work done in all incorporated State Charitable Institutions, under the title "*Suggestions for Improvements*" I found only two references to dental work: One states that "the Hampden School (a reform school for boys) has confined its dental care largely to the extraction of teeth"; On the same page it states that "the Middlesex School has a well-equipped dental laboratory, which employs a dentist one day a week."

This book of about 800 pages, gentlemen, the most complete report of institutional work in the State, has exactly *four lines on one page* devoted to dental work.

Not satisfied with this meagre information I obtained the Fifteenth Annual Report of the State Board of Insanity, a volume of 400 pages which deals more minutely with medical conditions, and found not a single reference to dentistry. The report of the Board of Prison Commissioners, a volume of 200 pages, contains no report other than a real plea for this sort of work by Dr. Edith R. Spaulding of the women's prison at Sherborn, Mass., who states: "One of the most important defects which presents itself in the physical examination of the women is the exceedingly poor condition of the teeth. Besides the extreme physical pain caused by such defects it will be remembered that poor teeth are a factor in many digestive disturbances, and the cause of much ill health. In the examination of sixty-four consecutive cases it was found that fifty-two were in need of dental work. Each individual had an average of four carious teeth; two-thirds of the carious teeth needed extraction, while one-third needed filling. The conditions caused by poor teeth alone form a large part of our medical work at present, and cannot adequately be corrected without the employment of a dentist in the institutions."

Seeking still further information, I wrote to thirty-four superintendents of institutions mentioned in the Report of the State Board of Charities and received in reply twenty-four letters, which disclosed the fact that in eight of the twenty-four some form of dental work is being done; six of these eight have a dentist one morning per week; one, three mornings per week. One (the State Infirmary) is blessed with the presence of a resident dentist. The other sixteen report no dental work done at their institutions. Therefore approximately twenty-five per cent. of institutions in Massachusetts have some form of dental work. (These letters I have with me; they are in most cases very interesting reading.)

In the almshouse, prisons, and State farms the system of medical inspection is the same. The new comer in these institutions is given a bath and hair cut, and a complete examination is made by the physician in charge. All clothes are fumigated, and if any eruptions on the body are observed, the inmate is immediately isolated. This careful inspection is as it should be. Stringency in individual cases safeguards the welfare of the whole. In this way many epidemics of infectious diseases are controlled. The introduction and spread of scabies, variola, etc., are minimized. But in spite of all these precautions epidemics do occur. Do neglected oral conditions enter as a plausible factor in these epidemics of mysterious etiology? Is the present system of inspection and treatment sufficient even though it includes all modern prophylactic measures, for example, the Wasserman test, blood-count, anti-typhoid serum, etc., which boldly disregard the oral cavity as a possible source of infection?

**Treatment of
Pregnant
Women.**

In the Massachusetts Lying-in Hospitals, under the jurisdiction of the State Board of Charities, there is a yearly average of 10,000 births. The method of treating pregnant women is improving each year.

Whereas, in the past, treatment was limited to care of the mother during labor and the child at birth, at present the care of the mother begins as soon as possible. As soon as pregnancy is reported various instructions are given to the patient as to diet, personal hygiene, etc. These precautions have brought forth favorable comments from gynaecologists and obstetricians throughout the country, and have been instrumental in reducing puerperal septicemia to a minimum. But search as I may in the reports of various lying-in hospitals, I have been unable to find any data regarding dental work. How many of these 10,000 mothers, charges of the State, need dental attention, during this most important period? The old adage, "For every child a tooth" is only too often proven true. The pains of labor are recorded as the greatest of all pains; add to these odontalgia and the pen of a Dante would be inadequate in describing the Inferno of the sufferers. During the first few months of pregnancy the teeth should be carefully guarded, all permanent fillings inserted and the patient submitted every month for examination. This would not only prevent odontalgia during the last trimester but would be the means of preventing this added nervous strain. Furthermore the mouth might be eliminated as a possible source of infection in post labor. Many of Boston's most famous obstetricians advocate dental care during pregnancy. One of these has stated: "The thorough treatment of a woman's mouth during the early months of pregnancy I consider of paramount importance to the health and comfort of the patient, and a prophylactic measure too often neglected in obstetrical practice."

**Dentistry
in General
Hospitals.**

In the general hospital the practice of dentistry is primitive indeed. The work is usually conducted as an adjunct to the out-patient department, and consists merely of extraction, treatment of fractures and general emergency cases. I do not mean to

underestimate the great good done by these dental clinics, but I feel that there is a much broader field in the main hospitals themselves which should be open to dentists. Every hospital should number among the members of its staff a dental surgeon with all the entailed rights of the other members. Before all laparotomies the teeth should receive diligent care. In most cases plastic work will be all that can be accomplished, but where more complete work is possible it should be done. Many dentists have advocated this before; but few indeed are the surgeons who are

impressed with the importance of oral cleanliness as an ante-operative procedure. In this department also I have been unable to find any dental data.

**Tuberculosis
Hospitals.**

In institutions for the treatment of tuberculosis how great a per cent. could be helped by dental treatment? This is another great field for dental work which is at present lying fallow. How many latent tubercular germs lying in the mouths of so-called cured patients are responsible for recurrence of the disease?

**Hospitals for
the Insane.**

In hospitals for the insane we find more desire for dental work than in all other institutions. This is probably due to the fact that here dentistry has been done, spasmodically, to be sure, but with noticeable results. For example; the report of the Lakeside Hospital for the Insane in Cleveland, printed in the *Dental Cosmos*, vol. 52, page 527, contains this significant statement. "Of fifty-eight cases of mental and nervous diseases nine were cases of dementia precoox operated on dentally. Six of these have recovered, two improved and one remains unimproved. These were cases of impacted teeth which evidently were causing sufficient reflex pain to affect the brains of the patients." Personal interviews with dentists connected with institutions of this nature substantiate this report. In most of these institutions in Massachusetts I find that there is a dentist in attendance one morning a week; but surely this time is very insufficient to the dental needs of the inmates, and affords opportunity only for emergency work. I quote the following from letters received from superintendents: First, from Dr. Frost, Boston State Hospital: "We engage the services of a dentist for two half days each week, and are planning to extend the service, which we find to be of much value." The second reads: "The services of the dentist have done more to add to the comfort of our patients than any one other thing we have ever done." My investigation showed that the insane hospitals are far in advance of other State institutions in the matter of dental care; but here too the conditions are far from ideal.

Consequently from a careful compilation of statistics it is in my opinion fair to state that eighty-five per cent. of all adults in State institutions are in need of dental work, and that less than half of these are receiving proper dental attention.

**Industrial
Schools and
Asylums.**

In State industrial schools, orphan asylums, etc., there are over 5,000 children between three and fourteen years of age. The oral conditions here are appalling, and the proper handling of the situation would be a serious problem. The only data on this

question which I have been able to find are reports from two boys' reform schools, whose total membership is less than 200 boys. These are the only two reform schools reported as having dentists; this in spite of the fact that in the report of State Board of Charities for 1913, page 103, there are recorded 989 cases of sickness in the Suffolk County School (of 95 members) during the year 1912, which indicates the probable health conditions which would be found existing in other institutions for children if the same medical scrutiny were used to bring them to light. All concede that over ninety-five per cent. of the public school children are in need of dental care. This same ratio must be true of public institutions, even though there exist no statistics of dental examination in these places.

Placing the Responsibility. In private charitable institutions I have found that a number have visiting dentists. An interview with these men discloses the fact that the work here

consists merely of emergency treatment; the dentist simply extracts a tooth when necessary, or relieves pain. Systematic dental work is therefore a rarity in all public or privately conducted institutions for children in Massachusetts. Admitting that these conditions do exist, who should be blamed for the epidemics of measles, diphtheria, and other childrens' diseases which sweep through public asylums, most of which cannot be entirely prevented even with the present modern medical system? Is it the poor children themselves, whose faces are scrubbed daily, heads washed weekly, and who are models of external neatness, but whose mouths are filled with virulent disease germs? Is it the superintendents, who are for the most part conscientious and over-worked in their efforts to keep within the State's appropriation? Is it the physicians and dentists themselves, who have not blended their cries often and loudly with those of the suffering children, to be heard by the powers who might remedy conditions? Whoever it may be, let him awaken and appeal to all public spirited citizens that these poor dependent children, our future citizens, may have proper dental treatment.

The Remedy. Gentlemen, these are the dental conditions in public and private institutions in Massachusetts. Now what is the remedy? The one solution to my mind is legislation which shall insure the appointment of a dentist to each institution, and of a committee whose duty it shall be to see that systematic dentistry is practiced therein. These dentists should receive sufficient monetary compensation to attract the ablest men of the profession to this most interesting field of work. Until this is done, and a definitely organized system of procedure is established under the auspices of the



State, all efforts by individuals in various institutions will be comparatively futile and useless.

To conclude: I have shown you, gentlemen, the non-existence of systematic dentistry in our State institutions and the crying need for such work. That the project is not merely the dream of an idealist, but most practicable and commensurable in its results I can prove to you by the following facts:

At St. Vincent's Orphan Asylum, Boston, a private institution, which houses 200 children, systematic dentistry was begun in 1910 as an experiment. Before this there was a yearly average of 103 cases of infectious diseases. Since that time there have been only five cases in all four years and not one case in the last year. These figures, gentlemen, tell their own story and need no further word of mine, I am sure, to convince you that systematic, compulsory dentistry is the physical salvation of the inmates in our public institutions. Gentlemen—I thank you.





New Jersey State Dental Association.

Second Day, Evening Session.

President Gelston called the convention to order at 8:30.

President Gelston. Immediately after the essay of the evening has been read and discussion thereupon finished a smoker and entertainment will be held in this room to which all are invited and everyone present is welcome to remain.

Dr. Fowler will now introduce the essayist of the evening.

Chairman Fowler. Mr. President and Gentlemen: It is with a great deal of pleasure that we announce to-night another era, another new discovery that is being brought forth at the New Jersey State Dental Association's meeting. The New Jersey State Society is one of those societies that make history in dentistry, and it is fortunate indeed that we are able to present to you to-night one of the newest things in modern dentistry. The work of Dr. William H. Fitzgerald, head of the nose and throat department of the St. Francis Hospital, of Hartford, Conn., stands out as distinct and as revolutionary almost as the announcement that came from Hartford many, many years ago by Dr. Wells and Dr. Morton. It seems to me a rather strange coincidence that another such discovery should come from that same city. I take very great pleasure in introducing to you Dr. William H. Fitzgerald.

(Dr. Fitzgerald then read his paper, which appeared in the March issue.)

President Gelston. I will now ask Dr. Charles H. Riggs, of Hartford, Conn., to open the discussion on this subject of Reflex Anesthesia.

Discussion on Reflex Anesthesia.

Dr. Charles H. Riggs. When Dr. Fitzgerald asked me to come here to your meeting I told him that I am no speaker and all that I could do would be to tell in a simple way what I had accomplished in my own work. When I first saw these illustrations I was rather dumb-founded; I did not think it could be done. However, I am here to tell you that it has made life a lot easier for me for the last three or four months. I have laid aside practically all local anesthetics. I spent, I think, about five days on one patient, working on two cavities. Then I used Dr. Fitzgerald's method and she left the chair not at all worn out or weary as usual, and the cavities were not easy ones, I can assure you. When she got through and went out of the office she said: "Dr. Riggs, dentistry has no terror for me in the future if you can do as well as that." I had a high-strung boy who was not at all well. I operated on him and he told me it hurt, but he said it was bearable. I do not know what further testimony I can give you. I might go on and relate instance after instance of grown people and children; you cannot fool a child very much. When these people have taken my treatment and have not complained I am sure that I am successful with it.

We are indeed glad to have Dr. Riggs with us
President Gelston. this evening to open the discussion, as Dr. Riggs is the President of the Connecticut State Dental Society and we are especially honored. I will now ask Dr. William J. Hogan, Hartford, Conn., to continue the discussion.

Perhaps next to Dr. Fitzgerald I have followed **Dr. William J. Hogan.** this work most closely. In regard to anesthetizing for the extraction of teeth I want to say that I have had a great many physicians and dentists for whom I have extracted teeth, and it is not my hobby by any means; rather it is something that I very much dislike. I have had one patient who was to have had ten teeth extracted. That patient has had gas administered four different times for the purpose of extracting those teeth and each time she became so hysterical that I was unable to do anything for her under gas anesthesia. Eventually under reflex pressure anesthesia and in the presence of three physicians I extracted those teeth. The only thing to remember in this work is to avoid soft parts and to work on the hard parts and there you can work with perfect success. One doctor from New Haven came up with a patient suffering so severely from pain of the face and so continuously that they were unable to drive it away. Even the effect of drawing her veil down over her face would give her

extreme pain. I think in seven minutes I was able to relieve that patient from pain, and she told me that for the first time in eight months she was able to use a handkerchief comfortably. I am not a talker but tomorrow I will endeavor to be a demonstrator, and I think I will then be able, more forcibly, to convince you of the virtue of reflex anesthesia.

We are indeed honored in having Dr. Hogan **President Gelston.** with us this evening as he is the President of the Hartford Local Dental Society. I will now ask Dr. B. A. Sears, of Hartford, Conn., to proceed with the discussion.

Dr. B. A. Sears. It is with great pleasure that I meet with and greet you. Reflex anesthesia is creating a world-wide question in the minds of the members of the medical and dental professions as we in Hartford can assure you. We have letters and postal cards and communications from all parts of the country asking how we do it. We are here to tell you how we do it, and not only here to tell you how to do it, but we are here to show you how we do it. I do not know that there is anything that will interest you more than some of the little instances that have occurred in my practice of extracting. One case which interests dentists particularly is one of an impacted wisdom tooth which a young lady of thirty-eight years said she had been troubled with for eight years. She had been to three or four gentlemen, one in New York, one in Newark, one in Boston and one in Buffalo, and also to other specialists in regard to removing that tooth, but she did not want to take an anesthetic. She said she would not take an anesthetic and she also said she had never been put to sleep by any man and she was not going to be put to sleep by any man.

Gentlemen, I got that wisdom tooth; I have her word for it and she says that if she has ever another tooth to be extracted she is going to hunt me up. I worked for her thirty-five minutes and I sweat—not perspired. I applied pressure on the inside of the jaw with my right hand like that (indicating) and I held it about three minutes. I made a very sharp incision and removed the gum tissue. I excised the gum about one-half of an inch and had my assistant hold the flap back. I was not in a hurry. I used an elevator and I got it in thirty-five minutes. That is only one case and there are many others to which I could allude.

President Gelston. We have with us Dr. James Lawton, of Middletown, Conn., whom I will ask to continue the discussion.

Dr. James A. Lawton. Mr. President, Ladies and Gentlemen: I first became aware of this method of anesthetizing teeth on the twenty-first of April, at the Connecticut State

Convention. The next day I went home and on that day a lady brought a small boy into the office who had a badly broken down first molar in the lower jaw, left side. I seized this finger (indicating second finger) and I pressed it for three minutes, and I seized the cheek, just opposite the first molar, and I squeezed that for two minutes, and the boy looked up and said the pain was all gone. He left the office and went outside and sat in the reception room, and he took his tongue and ran it around that point and after a little while the pain started up again. His mother then said: "I guess you had better take that tooth out." I gave him anesthesia pressure again and took his tooth out and he did not feel it. This was my first experience. My second experience was the case of a man who had a bridge put in on the left side above, from the first and second molar to the first bicuspid. He was suffering from headache. I relieved the headache by pressing to the left on a line with the palate, and I pressed the cheeks opposite. I also pressed the corresponding finger. After pressing them for some time I went to work. The patient did not feel it; he said there was no pain at all; in fact, he hardly knew what was going on and began to talk, and after I finished grinding and his tongue touched the instrument he said: "By Jove, that's hot." That was the first he knew of it. There is another case of a boy four years of age whose mother brought him into my office at about eight o'clock. I was just about closing up the office when they came in, and the mother said the child had had a bad toothache in the second molar for some weeks. The pulp was exposed. I did the usual things; I packed the tooth with some medicine which quieted it temporarily and let him go. Later on a lady in the drug store said the child was crying very hard and the tears were rolling down his little cheeks. His mother said it was still his tooth aching him. I walked over and I sat down on the chair and I seized his finger on the same side where he had the toothache, and I pressed it like that (indicating a pressure with thumb and fingers back of the knuckle of the second finger), but the boy continued to cry; but suddenly he looked up to his mother and laughed. "What is the matter?" his mother asked him. He said: "Why the pain has stopped." I met his father twenty-four hours afterwards and I said: "How is the boy?" He said: "He has not felt the tooth since you saw him."

President Kelton. I will ask Dr. Fowler to address you.

Shortly prior to the meeting of the Connecticut

Dr. Henry Fowler. State Dental Society, in April, I read an article in one of the New York papers concerning this new discovery, and it appealed to me as being something new which I myself had experienced, in a way, but not in this direct connection. I had discovered or had experienced by the hanging of my arm over a chair

the feeling of a perfect anesthesia in my hand. A great many of you, perhaps, have felt the same thing but you did not connect it as it has since been connected. Since that time I have thought that there must be some relation in that experience with the discovery made by Dr. Fitzgerald, as his work has been described, and it appealed to me as one of the new things coming out, and I made a special trip to see the work that was announced to be done by the Connecticut State Dental Society. What you have seen described here on the screen is what I and other men actually saw. Dr. Hogan was the man, and I think there were a half a dozen pins stuck in his arm, and this much any of you know would not be done for fun. I also had the pleasure and inspiration of seeing teeth removed with no reflex action at all by this same pressure not only by Dr. Hogan but Dr. Sears also. There were several cases of headache relieved during that convention by the various men who are here tonight. New Jersey dentistry has taken a new stand in the medical profession. The State of New Jersey recognizes that we are progressing, that we are reaching out into fields of discovery which relieve suffering humanity. We are opening up new fields for other states to follow, and it is a matter of a great deal of pleasure to us that we have here with us Dr. Fitzgerald, and you will see his demonstration to-morrow. At the present time you are likely to be skeptical, but as you go home from this convention perhaps there is not one dentist here but will be apt to be impressed with the idea that we have produced very, very satisfactory results in not only adding to practice a new discovery for the preparation of sensitive cavities, but which also will be apt to be put in practice in the extraction of teeth.

President Gelston. Does anyone else wish to discuss Dr. Fitzgerald's paper?

Dr. B. J. Kauffer. I think it is most wonderful the testimonials which have been presented and the work that has been accomplished. I have every reason to wish to compliment Dr. Fitzgerald on his work. I would, however, like to ask a few questions. I have enjoyed so much what I have heard that I want to hear more.

I would like to know whether I understand correctly that anesthesia is produced by pressure when the pressure is brought at the periphery of the zones, and if pressure brought at this point produces anesthesia throughout the entire zone. I would like to ask Dr. Fitzgerald as to his statement of pressure on the stomach and of a goitre being relieved by this pressure. Does this pressure cure the malady or in what way does Dr. Fitzgerald account for the loss of the goitre and the disappearance of the pain?

President Gelston. Does any one else wish to discuss Dr. Fitzgerald's essay?

Dr. Theodore Blum. Mr. President, I certainly was very much interested in the paper, and I must confess that I do not know anything about the method and I shall not contradict any of the statements that are being made. As far as pressure anesthesia is concerned, a good many of you think it is new. That is not so. It is very much older than the oldest man in this room or probably than the added age of two or three men put together. It has been done years and years ago. A statement was made by one of the specialists in regard to the relieving of pain in the lower jaw by pressing on the anterior dental nerve; that is nothing new at all. Pains have been relieved by this pressure, but it needs a longer pressure to get anesthesia. Curing goitre by pressure is absolutely against my knowledge of medicine, and while I am one of the youngest men here, as I have only spent about ten years in the medical and dental field, I cannot believe that curing a goitre by pressure is possible; nor any other infection. These organic diseases are diseases caused by infection, and if we would try to treat infections in any other way than that which we have now, we would have to throw over the work of men like Koch, and all the work that Pasteur has done; and so you see this is very difficult for anyone of us, and certainly for me to accept, after hearing this talk just one hour for one evening. I have heard men say that they had relieved pain by pressure and that is nothing new. We must not forget that we do not want to relieve pain just to make a patient comfortable. Any pain has a cause. It is a principle not only in medicine but in dentistry to treat the cause of the pain. There is no particular merit in relieving the pain alone. We can relieve pain with cocaine or with any other dope. One of the men mentioned the case of pain in the jaw of a little boy and of having put medicine in this cavity with which it was relieved for a time, and then the pain again returned. Afterwards this exposure and this pain from a dying pulp was relieved by the manipulating of, I think, the phalanx of the middle finger. This is certainly beyond me, and I must say so openly. I was very glad to hear the paper, but I must see very much more before I accept it.

President Gelston. We have been glad to hear from Dr. Blum. I will call upon Dr. Smith to say a few words.

Dr. Smith. Mr. President, I have listened to Dr. Fitzgerald's paper with a great deal of interest, but I must coincide with Dr. Blum, that it is certainly contrary to all our former teachings. I, however, am open to conviction. I would like to ask Dr. Fitzgerald this question? He illustrated a case

where the patient, a child, was operated upon and he brought pressure to bear upon the hard palate and relieved the tension and pain. I would like to ask him what would be the result where the patient is wearing a plate and where the suction was great, bringing pressure to bear upon the parts. I am going to be a subject for the clinic, if I am permitted, and I am going to ask these gentlemen to perform some operation of this character. If they can accomplish the effects claimed, as presented to us here to-night, I think it is a great thing, but "I am from Missouri."

I have listened to Dr. Fitzgerald's paper and to
Dr. Walter F. Barry. this discussion with a great deal of interest and I

have tried to remain seated. I intended not to have anything to say, and I will be very brief in what I have decided to say. I happened to be in Hartford with Dr. Fowler, last April, and heard Dr. Fitzgerald read his paper then, and I saw Dr. Sears and Dr. Hogan work there. I want to tell you that I went to Hartford after hearing a lot about this pressure method of anesthesia, with the idea in my mind that it was nonsense. I made up my mind that I was going to find out as much as I could at Hartford. Dr. Fowler and I took in as much as we possibly could between the two of us, and we said we would find out about this ourselves. We proceeded to a secluded portion of the room and took a dental chair. I was the operator and Dr. Fowler the victim. I proceeded to anesthetize the region of the upper right central according to the methods shown by Dr. Sears and Dr. Hogan, and after that I endeavored to anesthetize Dr. Fowler's gum tissue in that region. We found that we did not have any instrument to test it with so we selected his stick pin, and I stuck this pin into Dr. Fowler's gums. Believe me I did not spare him any; I forced that pin through his gum tissue all the way into the alveolar process and drew blood each time without interfering with Dr. Fowler's happiness; or, at least, he did not feel any pain because he did not move. I am a firm believer in the fact that this method will work wonders in certain lines, but I certainly do disagree with some of the speakers that have addressed this meeting, and with some of the statements that have been made here to-night in regard to certain possibilities of reflex pressure anesthesia. One of the gentlemen said that he could cure toothache with pressure anesthesia. He will have to show me how he can cure a pathological condition, such as a putrescent pulp. You cannot cure that by pressure nor can you kill the germs with all the pressure that was ever secured.

Dr. Hogan. Whether it is pressure or not that goitre disappeared; after working on the woman for three weeks or a month the Doctor showed her what to do and she went home and followed out Dr. Fitzgerald's orders, and the goit-

disappear. Why? The goitre has disappeared, it may be from pressure or something else. Some are more sensitive than others. I do believe that we have a wonderful discovery and I know that we have secured wonderful results. I will not say that I understand the principle, because I do not. I only tell you of the results I have achieved.

I do not want to throw any doubt on what has

Dr. Barry. been accomplished. I merely want to say that there are all kinds of goitres; there are at least half a dozen different kinds of swellings in the neck which are sometimes called goitres, and they are not goitres at all. I do not want Dr. Fitzgerald or Dr. Hogan to think that I am doubting that they obtained these results, but what I do say is that I would like to see it.

We are familiar with the old quotation, "All

Dr. Sears. men are liars." I have said before that there may be some who take exception to this method and who doubt pressure anesthesia. I know they will probably see it demonstrated a great many times and still say it is simply impossible. If that is the case with you, it is no more so than it was with me. I could not believe it at first. "I do not care whether you come from Europe or from Africa or from North America. I do not believe it." That is what I said when I first heard it. It was three months before we got together; it was three months before they got me to see Dr. Fitzgerald. I do not blame these men for asking to see what can be done, but bring the cases forth and we will show you what we can do. We do not claim that it is absolute anesthesia in every case. Perhaps in twenty-five per cent. you can get absolute anesthesia and in seventy-five per cent. analgesia. We have not anything to sell; we have not any books nor any pamphlets. If you want to go on with your experiments it is up to you; if you do not, drop it, and it will not cost you a cent.

Gentlemen, this pressure may be taken up from

By Dr. Fitzgerald. any bony prominence along the ends of these particular zones, perhaps in one place just as well as in the other. Naturally it is better, ordinarily, to work from the fingers, than it is from the elbow and from the shoulder or from the spine or the knee.

As to goitres: There are goitres and goitres; we will all admit that, and there are cancers and cancers and we will admit that also. I have shown you on the screen to-night about the pressures, and I have shown you this huge goitre on this woman sixty-three years of age. We have had them a number of sizes down to the size of the smallest. Here is her testimony and she is feeling well. We have in the first place felt that it was unfortunate, most unfortunate, that this announcement ap-

peared through the daily press. But that was not my fault. I have tried for two years to get my associates interested in it. I have written for certain medical papers, and I am a member in good standing of the medical societies, and I have been associated with doctors trained in Vienna and in England, and have worked with the best men over there, in my own particular line, and I have had exceptional advantages and opportunities, but I do not want you to believe that I am considering myself for a minute as being better than the great Professors of Vienna or the great professors and physicians of any other city. My training has been a good one, and I have had an exceptional acquaintance, and I have spent two and one-half years at the Boston City Hospital with the celebrated men there, and as I have already said I am in very good standing in many of the medical organizations. I went to Dr. Steadman, editor of the *Medical Record*, perhaps three or four months ago, and I said to him: "Doctor, you have not answered any of my communications." I had written to him and he was familiar with the matter. "They are ridiculous," he said, "you cannot expect us to believe that stuff." "Well," I said, "I do not blame you in the least. I do not blame anybody: Dr. Sears said he was skeptical at first and I was myself." I saw Mr. Wood and Mr. Wood said he was interested and thanked me for coming down, but he said: "It is too radical and from a financial point of view it would not interest us."

That is the point of view; it is the financial point of view. We are not saying that this is a cure-all, a panacea, but is it not a beautiful thing to demonstrate to you as members of the dental profession and as members of the medical profession, largely, that we can trace a connection from a molar tooth into the hands or feet? Is it not a beautiful thing, for instance, to trace a connection from the tongue into a malignant growth in the breast as we are able to do? These patients demonstrate it themselves. The medical profession want me to give them a theory on this. We know that we get a relaxation. We have demonstrated this in one of the largest clinics. I am not trying to make myself ridiculous or to treat by methods which seem ridiculous. We are using a method that is meeting with success. Dr. Sears and Dr. Riggs and Dr. Hogan all were skeptical and refused to believe, and to all of them it appeared ridiculous until they tried it. As Dr. Hogan says: We are not here to sell you anything, but we are here to give you the benefit of a little experience which we have had, and during the next one or two years ago, I suppose, we will go on with nitrous oxide gas and other agents, and I do not care, but I am able to prove with what we have already done what the Boston men said was absolutely impossible: We are able to trace from the throat a connection into the great toe or heel or into the end of the fingers. That seemed ridiculous to



them and how ridiculous it must seem to these same men when we can anesthetize from the finger or from the toe by pressure sufficient to extract a tooth without pain.

Reflex pressure anesthesia is brought about by grasping the second phalanx of a finger or a toe between the thumb and finger of the operator and holding it firmly close to the distal end for about one minute. During this time the grasp is on the lateral aspects. Then for another minute you press similarly upon the dorsal and plantar aspects. The degree of pressure is not painful. The patient promptly says that the finger feels numb and traces of numbness extending gradually upward the entire height of the body. When the numbness passes the location of the pain and suffering ceases, and when the area to be operated upon by dentistry or minor surgery is reached by the numb wave, surgery may be instituted without pain. The right hand or foot of the patient for the right lateral half of the body above, and the left for the other side. The thumb will anesthetize the two incisors on their own side; the forefinger the first bicuspid; the second finger the next two; the third finger the next and the little finger the last ones. These anesthesias always proceed upward. Use the thumb and fingers for dental work. It does not make any difference whether the pressure is applied to fingers or other parts of the body provided it is made upon any bony prominences. There is no bony prominence which will not give reflex pressure anesthesia upon pressure, the duration of which is from one to three minutes and which anesthesia lasts for about a half an hour, although the pressure can be repeated at any time, if necessary. Operators unfamiliar with the technique may not get the result at once, and should persevere until they do; it will never fail if it is correctly administered.

I am a member of the medical profession and I believe in medicine, as far as it goes, and I believe in everything that promotes health and improves conditions with which we are all meeting from day to day. I am willing to keep on experimenting for the good of the cause of humanity generally. I am not afraid of the criticisms of any of the professors in Europe or out of Europe, and that does not mean that I am putting myself above or on the same level with them as celebrated men. They know their work as far as it goes and I know mine, and they will know of my work still better ten years from now. Of that I am sure. I am not a hypnotist. We know perfectly well, as the Boston man said, that you are conscious, but you are unconscious of pain, and to that degree we are all hypnotists. If a physician can operate without pain or extract teeth or take care of cavities in the teeth without pain with this method, why should we not wish to do it? In ten years from now we will be able to read the affected portions of the human body from pressure on the tongue as the palmist reads the palm of the hand.

I do not claim to know the theory and I do not claim a universal panacea, and we do not know that we will know the theory as long as we live, but we do know the clinical results, and we know the A. B. C. of the discovery as far as we have gone, which we demonstrate, and that is what we are here for.

I could speak on this to you for two weeks but I am convinced that Dr. Sears and the other doctors here will be able to demonstrate, no doubt, many unbelievable things for you to-morrow.

Dr. Fowler. Moved that the society give Dr. Fitzgerald a rising vote of thanks for his attendance at this meeting and for his lecture. (Carried.)

Dr. Slade. Moved that a rising vote of thanks be extended to the gentlemen from Connecticut who discussed the question. (Carried.)

On motion, adjourned.

Morning Session, July 17th, 1914.

The meeting was called to order by the President, and after the transaction of routine business, the President called upon Dr. Fowler to introduce the essayist, Dr. Harold Clark, of Toronto.

Dr. Fowler. Mr. President and Members of the Association: Among the important things in the dental profession is that of their relationship to the general health, and by placing us on an equal footing with themselves by the recognition of the dental profession of the State of New Jersey, the medical profession has admitted the part that the dentist plays. The services of the dentists are constantly being called in to the assistance of the medical men and now we have the one case of recognition in our State by the medical profession. In our essayist to-day we have another. Dr. Harold Clark, of Toronto, Canada, represents this particular phase of the question, and I take very great pleasure in introducing to you Dr. Clark, who will speak on "The New Gospel of Health According to the Dentist."

Dr. Harold Clark. Mr. President, Ladies and Gentlemen: I want to thank you for the honor that you have done me in giving me a place on your program. I have been in practice for over twenty years, and I have learned to take a great deal of interest in the proceedings of the New Jersey State Dental Society. We look for epoch-making papers and the recollection of what I have read of the papers presented here, gave me many misgivings about ac-

cepting the invitation that was sent to me by the Chairman of your Program Committee. I am sorry that Dr. E. C. Kirk is not here, for he is fully responsible for my being before you to-day. He wrote a paper and read it in Toronto last year, and he and I have had a great many conversations and a great deal of correspondence, and in some way he gathered the idea that I might be able to read you a paper on a subject that I have worked upon, although it is one that should be handled by men of science and by laboratory men, whereas I am like most of you: just an ordinary, busy practicing dentist, but the subect is one that has always been of great interest to me.

(Dr. Clark's paper was published in the February issue.)

Discussion of Dr. Clark's Paper.

In his paper, Dr. Clark refers to two theories

Dr. Otto E. Ingls. which to my mind are incompatible.

The theory of Williams is that the acid forming bacteria form plaques at sheltered spots, and are the active agents in producing lactic acid which decalcifies the tooth beneath the plaque, the process proceeding from this initial starting point. Miller did not indorse this view but favored the idea that the bacteria found in the mass of carbohydrate produce the lactic acid in such mass, the acid then acting upon the tooth.

Pickerill indorses Miller's view, claiming in his book, *Prevention of Dental Caries and Oral Sepsis*, 2nd ed., page 24, that such a plaque as claimed by Williams "would tend to constantly dissolve its base of attachment," though on page 23, he shows that a film of bacteria (plaque) may be shown even upon an area of arrested caries, in which case presumably the plaque does not tend to dissolve its base of attachment.

Now Williams always found these plaques so attached to superficial caries of enamel that he could grind them *in situ* and demonstrate them by photomicrographs. If so how could they have dissolved their base of attachment? Certainly not without a very rapid reformation.

Miller, many years ago, claimed that filthy collections upon teeth often act as a protection from caries, though pyorrhetic conditions might arise. The reason given was, that the bacteria and food were gummed to the teeth (probably by mucus), and that while the first mass might form acid its capabilities in that chemical direction were soon exhausted, whereupon putrefaction set in and with its alkaline reaction the mass would either act as an inert or possibly a neutralizing barrier to the access of future masses with their acid producing capabilities which in turn would become putrefactive and thus thicken the mass.

To my mind Miller by this argument practically substantiates the theory of Williams. The difference between acid production and caries, and alkali production and immunity, being a difference produced by the partial cleanliness of the present day which permits a plaque of acid forming bacteria to receive a fresh supply of carbohydrate and thus obviates the staleness of the medium which Miller showed in his extra-oral experiments to be the cause of the production of the alkaline mass referred to.

Dr. Clark endorses Pickerill's view and Dr. Kirk endorses the William's plaque view, hence my contention of incompatibility of theory.

Dr. Kirk does not, in so far as I understand from his writings and personal conversation with him, as yet claim finality for his theory of a soluble carbohydrate entering from the blood by way of the saliva, but rather has blocked out a line of work which may prove that such a soluble carbohydrate as a prepared food for the bacteria in the plaques, readily assimilable by them, may exist in susceptibles and be absent in immunes.

Pickerill has furnished the information that the Maori have but one per cent. of dental caries, and he could not obtain evidence that they used any implements for cleansing the teeth. He also relates that Maori children brought under our civilized diet conditions changed to susceptibles in some degree.

Was this due to partial cleanliness permitting a renovation of the medium for acid forming bacteria or to the civilized diet furnishing a carbohydrate excess in the saliva, or to the carbohydrate diet allowing carbohydrate débris in the mouth, or to a change in the use of acid fruits? Pickerill's view is that the Maori immunity is due to the acid fruits and berries eaten under native conditions, which fruits stimulate later an alkaline flow of saliva for a long time, which saliva flowing over the teeth neutralizes the acids formed. I do not find in Pickerill's book any observations showing that a true caries susceptible has been changed to an immune by the acid fruit stimulation, though I fully admit the probable desirability and advantage of the free flow of alkaline saliva, as an aid in producing immunity.

Working as we do in communities pledged to cleanliness, it seems to me that the rational method is to endeavor to make it thorough on the part of the patient, instead of a cleansing at points which do not decay, or produce pyorrhea, and to supplement that personal attention with brush, floss and other special implements if needed, by frequent prophylaxis and by the antiseptic method when needed and later by the Pickerill method.

As an experimental method and later as a possible proven method

I wish to commend the idea of Dr. Clark that we should enter upon a campaign of observation of these matters ourselves, and the idea of appointing committees among dentists in order to get up a satisfactory diet list or other method of procedure seems to be of exceeding value. I beg to thank Dr. Clark for his paper and his expressed desire to have me discuss it.

Raymonde H. Murray, D.D.S. Before beginning the discussion of this paper, I want to state that I am not a pessimist, and my remarks must not be taken as indicating such spirit.

There are few statements in the paper to criticise or challenge. It is idealistic in character. I hope we will all live to see the time when teeth will be cared for as they should be, and to see a practical method of preventing dental caries in successful operation; not in individual cases, but generally employed; not for those with wealth, but for the poor as well. That the causes of peculiar susceptibility and immunity to dental caries are within a short space of being determined, seems probable to those who have heard of the research work done by Wallace, Pickerill, Gies, Kirk, Rose, and others.

The important relation which the work of the dentist bears to the health is conceded, since it has been demonstrated that arthritis, dyspepsia and other disorders of the alimentary tract, together with numerous other systemic troubles, are often traceable to unsanitary oral cavities. These findings are being confirmed by many investigators.

Infectious diseases are frequently spread, particularly among school children, by bacteria bred in unclean mouths.

This phase of the connection of the dentist with the health of the public Dr. Clark has not dwelt upon, evidently considering unclean mouths and carious teeth predisposing factors or causes of these systemic disorders. The dentist is the physician of the mouth, and when the public realizes that proper dental care will prevent many forms of ill health, then will the dentist occupy his rightful position in the community.

There can be no doubt but that the idea of prevention, as outlined by the essayist, is the ideal future for us to look to and aim to attain, but many things stand in the way of its success.

Medical Prophylaxis. The medical profession has made considerable progress with preventive medicine, as is evidenced by vaccination to prevent smallpox, serums to prevent typhoid, anti-toxins and autogenous vaccines to ward off other maladies, and by advising sanitary regulations to stamp out yellow fever, cholera, hook worm disease, tuberculosis, etc.

Health authorities have formulated laws relative to measures which

must be taken as a means of preventing certain infectious diseases, and they are invested with power to enforce these regulations.

The public co-operate with the health boards in their work, because of a realization of the penalties of sickness and death, which are often exacted from non-compliance with their rules. The medical profession has spent years educating the public along these lines.

In our branch of the profession an entirely dif-

Dental Propylaxis. ferent problem confronts us. The teeth have always been looked upon as something apart from the rest of the body, and as having comparatively little bearing on the general physical well-being. Severe illness or death is rarely attributed to tooth conditions, and yet we know that many diseases of serious nature have their inception in uncared-for mouths.

People must be educated to a knowledge of the important bearing of the teeth upon health and disease. Efforts are being made to do this, and despite the fact that it is slow work, and that it will be years before such knowledge becomes general, the ultimate result justifies the expenditure of the time and energy required. In many communities the results of this educational propaganda are beginning to show.

The great majority of people are careless about the condition of their teeth, rarely visiting a dentist except for relief from pain. Of the others, how often a patient will leave the dental office, with teeth in a good state of repair, and promise to return in six months to the minute, so as to prevent such trouble as has just been remedied; and how often do they keep their promise, even if reminded of the time with a card? A few individuals may return at the end of the six months, but usually the elapsed time between visits is nearer to six years than months, unless pain compels the visit. Why is this so? Just plain, every-day human nature. We are all gamblers in one way or another, and most of us gamble continually with our health; it is human nature to do so. We overeat, over-drink, smoke too much, overwork or overexercise, and so long as we can persuade ourselves and our friends that we look and feel reasonably well, we just take a chance and let things slide along in the most comfortable and pleasurable way. Most people treat their teeth in this manner. As long as there is no disagreeableness or pain, they take a chance, and delude themselves into the belief that everything is all right. Do you suppose if you instructed the great majority of fathers and mothers in an exact diet for their children (and it would have to begin with them), that those parents would, or could, compel a strict adherence to that diet, even if they knew positively that by so doing the child would have a perfect set of teeth? I must admit I have never seen nor heard of such parents, although they might possibly be found. I am glad mine were not of that kind. Can



you not imagine the difficulty of enforcing a special diet on a child to whom it was distasteful? With half a dozen children in a family, what a happy home it would be.

As I said earlier in the discussion, health authorities can compel obedience to certain sanitary regulations for the prevention of some diseases, but you could not enforce any regulation of diet, to act as a preventive of dental caries, if every last person on the globe were made a member of the health board. That is why I say the paper is idealistic; dental caries cannot be prevented by any such means. The effort to prevent caries will have to be a voluntary one on the part of parents and children, and education is the only way by which we can hope to accomplish the desired result.

I have been greatly interested trying to prevent destruction of the teeth by some of the methods which have been recently advocated, but in spite of bribery, threats, cajolery and pleas, I have found the majority of patients to be backsliders after a few weeks or months. Either the vinegar bottle broke or they did not like the taste, or any of a dozen excuses were offered for failure to carry out the treatment as directed. Occasionally a patient will prove an exception to the general rule, and will follow directions explicitly. I will cite one such case.

A young lady of thirteen years came to me

Case from Practice. about three years ago with her teeth in very poor condition, many cavities, saliva thick as mucilage and of great quantity.

I filled the cavities with gutta-percha, copper amalgam and copper cement, and the fillings lasted well, but every few months there was a new crop of cavities to be cared for. About a year ago I prescribed lime water, three parts, peroxide of hydrogen one part, to be used for cleaning the teeth (this is Dr. Kirk's formula); restricted her use of sugar; advised a well varied diet and outdoor exercise. After consulting with her physician I prescribed syrup calcii lacto-phosphate in drachm doses after meals. The young lady has been very faithful in following my instructions. There is a marked improvement in her health, the saliva is about normal in quality and quantity, and but two new cavities have appeared in a little over a year, and those soon after treatment was begun.

Whether this improvement is due to diet, mouth wash, restricted use of sugar, exercise, the lacto-phosphate, or to the combination of them all, I cannot say. All I know is that something has brought about a marked change in the condition which existed prior to the treatment.

I am for the prevention of dental caries and for oral hygiene, heart and soul, and am trying to do my part in spreading the gospel of tooth health in its relation to bodily health, but we have to reckon with our

old friend, "human nature," which must be considered in discussions of this kind if anything is to be gained other than talking in the air.

Other forces must have a decided influence upon the teeth than diet alone. Admitting the case of the Maori children which the essayist cited, can we lay this sudden decay of the teeth to a changed diet, when their whole mode of living was altered? If parents whose teeth show only one per cent. caries beget children whose teeth show 50 per cent. caries after a few years of partial civilization, how can we expect parents whose teeth show 98 per cent. caries to beget children with anything but teeth particularly susceptible to the ravages of caries? Could the results we desire be accomplished by diet alone? Would not heredity, mastication, elimination, exercise, and many other factors have to be taken into consideration?

Let us now look to the dentist himself. How large a proportion of our profession are practicing the very best dentistry they know how to practice, making every effort to do preventive dentistry, striving in every way to keep in touch with the latest theories and discoveries, and by applying them in such cases as they are indicated, prove or disprove their soundness? How many have read and put into practice any of the theories of Wallace, Pickerill, Kirk, or Gies? How many attend dental society meetings with regularity, and read the dental journals, trying the newer methods of which they read or hear? I will not attempt to answer these questions, other than to say that here again we have to deal with our same old friend (or enemy?), human nature. From my observations it seems that a great many of our brethren do the easiest and most comfortable thing. They forget about the dental society meetings and neglect to renew their dental journal subscriptions; in other words, they get into a rut, wear it smooth, find it comfortable, and stay there.

Lest you think I am pessimistic, yet me tell you that I believe the dental world is in the midst of an upheaval from which the profession will emerge on a loftier plane than it has yet occupied. More attention is being given to scientific investigation by our men and societies; higher standards of education are being made obligatory for the prospective dentist; many new societies for study are forming; a spirit of fellowship and fraternity is being manifested between the M.D. and the D.D.S.; and the general public is gradually becoming educated to the advisability of proper care of the mouth and teeth and demanding such care from the dentist.

The development of stronger teeth, the prevention of dental diseases and better dentistry for those who need it, by better dentists, are thoughts which must be ever before us.

I have tried to show that knowledge of how to prevent dental caries

will not suffice in actually preventing the condition. There are many other problems having an important bearing on the subject which must be taken into consideration. We can be of great service to our patients; endeavoring to prevent disease by giving the teeth of every individual the best possible attention, and by educating our patients in the importance of clean, healthy mouths and teeth.

I appreciate having had the pleasure of discussing this paper, and thank Dr. Clark and yourselves.

In my estimation there should be no such thing

Dr. Vernon D. Root. as failure for any man who has taken up the profession of dentistry. Probably he may not be successful in the mechanical field, but there are so many specialties that come under the category of "dentist," that it should never be necessary to give up the work. What a blessing to a man who finds that he has wisely chosen and gives his very soul to the saving of humanity physically, mentally, and morally. What a satisfaction to be able to diagnose and almost immediately relieve. The uncertainty of diagnosis and the too often unfavorable prognosis influenced me in my choice of a profession. What great strides we have made in the past fifteen years. We have Taggart with his valuable inlay system; we have porcelain art perfected as never before; we have Gysi with his natural articulation; we have beautiful moulds with their three-point contact; we have analgesia by Teter; mandibular and conductive anesthesia by Fischer, and last but not least, reflex anesthesia by Fitzgerald.

How eager men are to equip themselves, even spending hundreds of dollars for the study course and the mechanical device to be able to save pain for his fellowmen.

Up in Rochester it was almost impossible to get within hearing distance of men teaching analgesia and conductive anesthesia. Yet how few were interested where preventative medicine was being demonstrated. We as a profession are making a grave mistake. We should awaken from this Rip Van Winkle sleep, and demonstrate to ourselves and to the world that we have in our possession sufficient knowledge to combat all decay, and are able to keep our patients immune by carrying out Pickerill's method, in combination with rigid dietetic rules, and in so doing prevent this carbohydrate acting as a medium for the development of organisms in the mouth.

When the profession work as a unit along this one line then will removable bridgework, inlay system, impression methods with artificial articulation, analgesia, exodontia, and reflex anesthesia fade away in oblivion.

President Gelston.

I shall ask Dr. Clark to close the discussion.

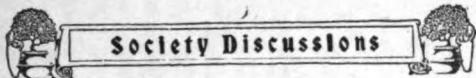
Dr. Clark. Mr. President, Ladies and Gentlemen: I must thank you very cordially for the very kind way in which you have received and discussed my paper.

There are some points in the discussion to which I should like to refer in closing.

Dr. Inglis is a college man and I feel somewhat timid in replying to some technical points he has raised, inasmuch as I am only an ordinary practising dentist, and have not had the scientific training to enable me to discuss worthily some of his statements. I would like, however, to say something about plaques. From my own experience, I am satisfied I can make or unmake plaques on my teeth practically at will. While I adhere to the regimen of diet I have laid down for myself, I think I may say my teeth will show no plaques whatever. But let me make certain modifications and in a few hours my teeth will be covered with them. I would account for it in this way: We all know that starch makes an excellent paste. Now, if saliva becomes acid it ceases to act as a digestive, converting the insoluble starch into soluble sugar. It also thickens or coagulates the mucin. If this digestive function is checked, the starchy débris in the mouth is thoroughly wetted and becomes a paste that adheres to the teeth. Whether the composition of these plaques is simply undigested starch or whether the thickened mucin forms an element in them I am unable to say. But I do know that if I indulge in sweetened starchy foods, drink cocoa and neglect fruit, I will promptly have plaques all over my teeth.

Human nature is probably much the same variety here as I find in Canada, and, in my experience, I have enough patients eager to do the best for themselves, or their children to make any educative effort well worth while. Of course, a large number of our patients are like the old roue whose physician advised him to give up wine, women and song if he wished to regain his normal health and well being. Subsequently, he complained to the physician that he wasn't much better, and when asked if he had carried out the advice given him, he replied: "Well, I don't sing anymore!" All missionary effort must be content with partial success.

Some have argued that an open air life accounts largely for immunity to caries. I have, in my recent experience, a case that has an interesting bearing on this contention. A family of several daughters includes one who is and always has been a very delicate child and almost blind as well. The others are all hearty and strong. Although the frail sister is much confined to the house, her teeth are almost entirely free from caries. The other girls all have evidence of frequent visits to the



Society Discussions

An inquiry into the diet of the children revealed the fact that my physician had ordered for the sickly daughter a diet that minimize fermentation, and sugar was eliminated. The inference
s.

osing I would like again to thank you for the interest and at-
you have given my paper and its discussion.





The Kingsley Marble Bust of the Saviour.

Several years ago, when Dr. Norman W. Kingsley had retired from practice and was living on a small farm in New Jersey, the writer conceived the idea that it would be a fraternal courtesy if his confrères should contribute to a fund with which to purchase the marble bust of The Christ which Kingsley had modeled and chiseled, and place it where it might ever remain as a memorial to the artist-dentist. It would not only be a pleasure to the man in his declining days to see his cherished work thus recognized, but the money would likewise prove acceptable.

A circular letter was therefore mailed to those that knew him, outlining this purpose, with the result that the response was most generous, nearly fifteen hundred dollars being contributed. This sum was given to Dr. Kingsley, and shortly after, the marble was delivered to the writer with a letter authorizing him to make final disposition of it.

It would have particularly pleased Dr. Kingsley to see the piece of sculpture go to the Metropolitan Museum of Art, but the directors of that institution declined the gift on the ground that they possessed insufficient space for the proper exhibition of the statuary already in their possession, and plans for annexes to the main building for many years to come contemplated only the housing of other departments of art.

For several years, therefore, the bust has remained in the office of the writer, who constantly sought for a suitable final disposition of it.



would prove satisfactory to at least the majority of those who contributed toward the fund. Several plans were discussed with s, but none was evolved that did not meet some opposition, until Dr. Kingsley died, and at his funeral, which by his dying request in that church so widely known as "The Little Church Around the Corner," it occurred to the writer that as this had been Kingsley's church, and just "around the corner" from his last place of it might be fitting to deposit the marble in this religious edifice. s discussed with the other pall-bearers, and the concensus of was that, having been the work of a dentist, it should be placed tal institution. The writer then suggested that it might be offered Evans Dental Museum when opened, and this met unanimous

sequently, just prior to the dedication of the Evans Dental In- and Museum, this work of art was offered to the Institute and . It has been placed in the Library, and may perhaps inspire positories of a similar nature. It is understood, of course, that seum" feature of this institution was meant only as a repository us collections and possessions of Dr. Evans, yet since the word n" enters into the name, it might be advantageous to amass and e together such objects as may in time aid in marking periods in rogress and dental history.

The writer sincerely hopes that this disposition of this cherished marble may prove satisfactory to all who contributed to the

**e First
Model.** It may not be amiss at this time to mention an interesting incident. When Kingsley first seriously undertook sculpture he rented a "studio" and worked there alone, none of his confrères ever suspecting riance to this avocation. After a meeting one night, Dr. Kingsley Dr. Wm. H. Atkinson and a few other kindred spirits to visit his Arriving there, he lighted the room by degrees, and as the clay lowly became more discernible through the disappearing darkness, e group of men gazed first in curiosity and then in admiration. n was the first to speak. Stepping forward and removing his hat imed, "The Christ!"

Kingsley was delighted at this spontaneous tribute of recognition of his art, and after dismissing his guests decided to sleep, as he often did, in his studio.

About two hours later he was awakened by a loud sound, and jumping up made a light. Imagine his dismay at seeing his finished model lying face down upon the floor, where it had fallen from the pedestal. In deep grief, but with that indomitable will for which he was noted, he lifted the clay back into position, and at once set to work in an effort to restore what had been completely destroyed by the fall, the face. Day after day he worked until he finally completed the model of that which later he chiseled in the marble. The present figure, therefore, was not his original modeling, and though beautiful, Kingsley often declared that it was not so fine as the first. Yet it has satisfied thousands.

Harrison Anti-Narcotic Law.

The following is a communication obtained by one of the State Board of Examiners in order to determine the status of dentists applying for registration under the Harrison Anti-Narcotic Law. The attorney consulted investigated the matter and then wrote as follows:

"We are just in receipt of a letter from the Collector of Internal Revenue advising us that, as suggested in our letter, the Commissioner of Internal Revenue has ruled that the terms, 'legitimate practice of his profession,' as used in the Harrison Anti-Narcotic Law, require that a physician, dentist or veterinary surgeon, in order to register under the provisions of this law, must have complied with all of the laws of the State in which such physician, dentist or veterinary surgeon resides.

"Yours very truly,

"(Signed) ARTHUR H. MANN,
"(Counsel)."

It is suggested, therefore, that State Boards of Examiners could render assistance to the Collector of Internal Revenue by furnishing him their records of legal practitioners of dentistry.



Around the Table

MONTH, in the editorial, I propounded a problem and invited a solu-

I asked the question in the editorial because I wanted to give it a
ninent place, where it would attract attention. Apparently I ex-
ed poor judgment; perhaps after all the editorials do not attract so
h attention as editors are prone to believe. "Be that as it may," as
of our comedians puts it, this particular question in this particular
orial does not seem to have elicited any great plethora of replies. I
supposed that Uncle Sam might have found it needful to put an extra
man on our route to bring me the letters from the thousands who
v the answer. But no! Either the professional answerers are busy
the war problems, or else they do not know the answer to this
icular riddle. But that can't be, can it? There is always some fel-
somewhere, who knows the answer to anything!



RE IS SUCH A FELLOW he has not taken his pen in hand, or
typewriter girl, as the case may be, to forward to my address the
tion for which so many are waiting. Up to date no one has taken
least notice of that editorial. Not one single (nor married) man has
in even the faintest semblance of an answer. And I had counted
a real live table talk over it. But I am not to be thwarted! As you
l see!



THOUGH, just to refresh your memory, and to reopen the subject,
t were, let me briefly put the query. Dr. Hartzell, and others, claim
improperly filled root canals may result in infections, which later
taint the entire system, possibly resulting in arthritis, stomachic,
er, and a few other little troubles which unfit a man for business, and
ourage women from attending the regular weekly sessions of the
ister-Susie-Soldier's-Shirt-Sewing Circle." Dr. Best and others follow
up with the statement that the only certain way of being certain
t you have certainly filled a root canal is to take "before and after"
ures with the X-ray. "And if you do not believe this," says Mr.
diographer, "just send one of your old root canal fillings around to

- ❖ my office, and I wager you will not show the picture to the patient."
- ❖ Lastly comes Dr. Average Dentist, and he it is who asks the question:
- ❖ "Admitting that it is best to use the X-ray in connection with root
- ❖ canal work, please Mr. Radiographer, Dr. Hartzell, et al. (whoever they
- ❖ are) tell me how I can do it for patients whose limit for filling a tooth,
- ❖ from foramen to occlusal surface is five dollars, and in some cases
- ❖ three dollars?"



THERE IS THE QUESTION! What is the answer? Thus far from the

- ❖ North not a sound. From the East silence. From the South not a
- ❖ letter. And from the West not a syllable. But as I said before, I am
- ❖ not to be thwarted! There must be an answer, else the Average Den-
- ❖ tist must continue to infect patients because of his inability to use radio-
- ❖ graphy, inclusively with his other materials and work at five dollars
- ❖ per tooth.



THIS TABLE where I am sitting is not a supper table in a gilded hotel

- ❖ palace, nor in a gorgeous rathskeller. Still it is a table. My writing
- ❖ table. And at my right hand is my telephone. With a telephone **you**
- ❖ can get some sort of answer from somebody—sometimes. So here goes!



"HELLO, CENTRAL! GIVE ME LONG-DISTANCE. Hello, Long-dis-

- ❖ tance, give me Hartzell, in Minneapolis. What is that? Of course you
- ❖ do. You must know Hartzell. Why he is the man who threatens you
- ❖ with arthritis if you do not have your dentist fill the roots of your
- ❖ teeth properly. Yes! Yes! Thomas B. Hartzell. I was sure you knew
- ❖ him! Hello, Hartzell. Glad to hear your voice. Called you up on the
- ❖ everlasting question of root filling, or the question of everlasting root
- ❖ filling, whichever you prefer. Did you read my last editorial? Yes?
- ❖ Good! Well, then, why the deuce haven't you answered it! Have not
- ❖ had time? Too busy? Why don't you know it is only the busy man
- ❖ who ever finds time to do things? Well, then! Answer it now, and go
- ❖ slowly, because I am no stenographer, and I won't have time to send
- ❖ proof to you." This is what he said:



THOMAS B. HARTZELL. "My own attitude in regard to this matter, in

- ❖ brief, is this. Do the very best root canal work that you can in each
- ❖ case, and check it up by a radiograph. If the radiograph shows that
- ❖ your root canal is imperfectly filled, make regular examinations of that
- ❖ area by radiography, from time to time, and if the tooth in question is
- ❖ found to be infected at any time, extract it. My feeling is that we should
- ❖ not run the risk of infection from badly filled root canals if we know it,
- ❖ and that rather than to expose the patient to the risk of constitutional
- ❖ infection from such badly filled root canals, we might better sacrifice
- ❖ the tooth. This is not to be interpreted, however, as a recommendation
- ❖ for the wholesale extraction of all dead teeth. We may be compelled
- ❖ to come to that in time, but we should not jump to the conclusion that
- ❖ it is an absolute necessity, until further research work has been done,
- ❖ which will settle beyond doubt what our line of action should be, in
- ❖ order to be fair to the patients who entrust themselves to our care."



NNOT DISPUTE THAT, can we? But it does not help Average
tist and his five dollar patients much, now does it? Well, let us try
in. Friend Callahan, he of the "acid reputation" (joke not original),
been working in root canals so long he ought to know just what it
worth. Hello, Long-distance! Hello! Stay right on the job. I am
half through with you. Give me Callahan. Of Cincinnati? Of
urse. Thought you would know him. Hello, Callahan! What is your
ver to the problem in my last editorial. What's that? Got it all
ten, but not mailed? Good, you dear old dependable. Read it to me
se. Which he did.

■ ■ ■

LLAHAN. "What to do with root canal work where the patient is
able to meet a reasonable charge by the dentist is a question that
cannot answer in anything like a satisfactory manner. The filling of
root canal is easy, quickly done, and costs little time or effort. The
treatment, as a rule, is rather simple also. It is the preparatory steps,
canal preparation, getting through to the seat of the inflammation,
costs. And so long as we believe it necessary to establish aseptic
communication with the seat, or possible seat of infection, the expense
continue to be prohibitive for people of very limited means."

■ ■ ■

ONLY A PESSIMISTIC PRONUNCIAMENTO FOR THE POOR.
all, let us not despair. We will ask another man. Long-distance,
me Buckley. J. P. Buckley, of course! Who else do you suppose
would approach on this subject? What is that! Why of course I
ought you were listening. That you Buckley? Answer my last edi-
al please!

■ ■ ■

CKLEY. "The gentleman who wondered if you would extract a
entral incisor in the mouth of a young girl simply because the root was
properly filled, should remember that there is no reason why a cen-
incisor root canal should not be properly filled. The question of
for this work can hardly be eliminated, and yet it is one which each
operator must settle for himself. All work should be done with the
care and respect for detail regardless of the fee."

■ ■ ■

IS TRUE, BUT ALTRUISTIC. Fearing I might be using the
ong word I pause here and look up altruism. Dictionary says that
uism is "benevolence for others regardless of self interest." So I
ss I used the word correctly. There is a gentleman up in Ann Arbor
ose views I know will be welcome to you all. Long-distance, get me
Bunting.

■ ■ ■

SSELL W. BUNTING. "The question of fees to be obtained for
root canal work involves the social and ethical factors of the case, which
have no set rule. We know that the same operations for appen-
tomy, hernia, etc., which are done in leading hospitals by a corps
doctors, nurses, and attendants, are being duplicated every day by
ical men who are working alone under most adverse circumstances,

♦ and without the hospital accessories. We will grant that in the long
 ♦ run the chances for success will be vastly in favor of the men in the
 ♦ hospital, but the other class of practitioners are doing a great work and
 ♦ saving many lives. The matter of fees and practice must then be in-
 ♦ dividual and should be determined by attending circumstances. The
 ♦ main issue is surgery, good surgery; the best we can give."



AMEN TO THAT SAY I. But that five dollar fee crowd are still unserved.

♦ Well, I think I may catch one more man before bedtime. Long-dis-
 tance, Dr. Best please. Minneapolis, of course.



DR. ELMER S. BEST. "I cannot see how your question can be answered

♦ outside of the office of each dentist concerned. If a dentist knows that
 ♦ it is a choice of doing compulsory charity work or probably an imper-
 ♦ fect operation, he must decide according to his own best judgment. If
 ♦ his clients cannot pay for such services as they should have, I think the
 ♦ dentist fulfils his entire obligation when he explains the situation frankly
 ♦ to his patient, leaving him to determine whether to have the proper ser-
 ♦ vice and pay the fee, risk an imperfect operation and possible systemic
 ♦ infection, or have the tooth extracted. As a closing commentary I would
 ♦ say that a recent examination of the index of our X-ray department
 ♦ caused a great shock to me, as I found such a startlingly large percent-
 ♦ age of improperly filled roots which had resulted in necrosis. This has
 ♦ forced me to believe that the handling of tooth pulps, their conserva-
 ♦ tion or removal, and the treatment and filling of canals, is the most im-
 ♦ portant problem confronting the dental world to-day."



WELL WE HAVE THIS DISCUSSION started anyway. I do not exactly

♦ think that any of these gentlemen have helped Average Dentist very
 ♦ much except to increase his determination to do his best regardless of
 ♦ fees. But the trouble is we cannot always do our best regardless of fees.
 ♦ The man who tries to do that would need to be a multi-millionaire, be-
 ♦ cause a dental practice will always grow along the lines of least resis-
 ♦ tance. Let any man install a radiographic outfit, and then give time
 ♦ and conscientious skill to root canal treatment regardless of the fee, and
 ♦ he surely will soon be inundated with that sort of work. And he will
 ♦ find himself in the position of the rival broom makers. Each reduced
 ♦ prices till one was selling below the actual cost of production. His
 ♦ competitor asked: "How can you sell below cost?" And the reply was
 ♦ "Think of the tremendous volume of business it will bring me?" And
 ♦ the more experienced man thought, and he shuddered.



BUT LEAVING THIS subject of brooms, however clean they may sweep

♦ and returning to the question of the proper care of root canals at low
 ♦ cost, I do wish that many besides those that have contributed to this
 ♦ night's telephone discussion, would ponder upon the problem and pro-
 ♦ pose a solution. For there must be a solution. It cannot be that den-
 ♦ tists must continue to do a style of work which our best-informed men
 ♦ tell us is a menace to the health of the patient, merely because the
 ♦ patient is not a wealthy man. Indeed, in a glimmering sort of way a
 ♦ possible solution has occurred to me, and if no better one is offered
 ♦ soon I may expound it.



Dr. Ralph E. Luther.

Died February 12th at St. Luke's Hospital, Chicago, Ill., from pneumonia, in his thirty-ninth year, Ralph E. Luther, D.D.S., of Batavia, New York.

Dr. Luther was born in Warsaw, October 26, 1876. He was a graduate of the Warsaw High School and the Dental Department of the University of Buffalo, class of 1900, and in September of the same year commenced the practice of dentistry in Batavia.

He was married to Miss Marion Duncan in 1901, and is survived by his wife, two sons, Duncan and John; his mother, Mrs. Mary E. Luther; two brothers, Kendrick, of Syracuse, and Guy S., of Schenectady, and a sister, Mrs. Roy McGregor, of Batavia.

Dr. Luther was a charter member of Mu Chapter, Xi Psi Phi Fraternity, and had served as Deputy Supreme President. He was a member and past president of the Eighth District and Batavia Dental Societies, and a member of the Dental Society of the State of New York, and chairman of the Committee on Oral Hygiene, the National Dental Association, and Rochester City Dental Society. He was also a member of the Masonic Fraternity and various other local organizations, but was particularly active in affairs of the Young Men's Christian Association and boy scouts, where he rendered much valuable service by his untiring energy and enthusiasm.

Dr. Luther took a prominent part in matters connected with oral hygiene, and was one of the pioneers in the work in this State. He has made a specialty of pyorrhea work, and just prior to his death had completed a course in Chicago. Dr. Luther was a man of fine ability as an operator, and gave much promise of a brilliant future. He was an upright, conscientious, high-class professional man, one who observed all the finer rules of conduct toward his patients and the profession. He was a splendid type of a high-toned professional gentleman. In his death the profession loses an intelligent, able and indefatigable worker, and his family and friends a kind, generous and lovable companion and friend. His loss will be mourned by a large circle of friends and acquaintances, who honored him for his many attractive qualities of heart and mind.

H. J. BURKHART.

Dr. E. S. Holmes.

Dr. Ezra S. Holmes, said to be the oldest dentist in Michigan, died in the Reed's Lake Sanitorium, November 11, 1914, age 95:

He had been a resident of Grand Rapids since 1865, moving to that city from Lockport, N. Y.

He was born in Niagara County, N. Y., July 15, 1819.

He opened an office in Grand Rapids more than half a century ago, being associated with the late Dr. L. A. Rogers. Throughout all that period of his practice he was considered one of the leading dentists of the city, and one of the foremost members of his profession in the State.

He was at one time offered the chair in the University of Michigan, but declined because of the exactions of his practice. He was President of the Grand Rapids Dental Society for two years and of the Michigan State Dental Society for two years. Several years ago the name of the Grand Rapids Dental Society was changed, and it is now known as the E. S. Holmes Dental Club.

Until his last illness he enjoyed wonderful robust health. His mind was alert and he kept himself informed in all matters relating to natural science.

He was connected with a number of important institutions in Michigan. He was a founder and for many years President of the Kent Scientific Institution, which afterwards became known as the Kent Scientific Museum.

He is survived by one daughter, Miss Jennie W. Holmes and two nieces, Miss Elizabeth A. Holmes and Mrs. L. C. Remington.





National Society Meetings.

PANAMA-PACIFIC DENTAL CONGRESS, San Francisco, Cal., August 30 to September 9, 1915.

Secretary, Dr. Arthur M. Flood, 240 Stockton St., San Francisco, Cal.

State Society Meetings.

ALABAMA DENTAL ASSOCIATION, Montgomery, Ala., April 13, 1915.

Secretary, Dr. J. A. Blue, Birmingham, Ala.

ARIZONA STATE DENTAL SOCIETY, date and place will be announced later.

Secretary, Dr. J. L. O'Connell, Phoenix, Arizona.

ARKANSAS STATE DENTAL ASSOCIATION, Little Rock, Ark., May 13-15, 1915.

Secretary, Dr. W. B. Dormon, Nashville, Ark.

COLORADO STATE DENTAL ASSOCIATION, June 17, 18, 19, 1915.

Secretary, Dr. Earl W. Spencer, 119-120 Pope Block, Pueblo, Colo.

CONNECTICUT STATE DENTAL ASSOCIATION, Hartford, Conn., April 20-22, 1915.

Secretary, Dr. E. R. Bryant, New Haven, Conn.

FLORIDA STATE DENTAL SOCIETY, date and place will be announced later.

Secretary, Dr. Alice P. Butler, Gainesville, Fla.

GEORGIA STATE DENTAL ASSOCIATION, Atlanta, Ga., June 17-19, 1915.

Secretary, Dr. M. M. Forbes, 803 Candler Bldg., Atlanta, Ga.

**Items of Interest**

ILLINOIS STATE DENTAL SOCIETY, Peoria, Ill., May 11-14, 1915.

Secretary, Dr. Henry L. Whipple, Quincy, Ill.

INDIANA STATE DENTAL ASSOCIATION, Indianapolis, Ind., May 18-20, 1915.

Secretary, Dr. A. R. Ross, Lafayette, Ind.

IOWA STATE DENTAL SOCIETY, Waterloo, Ia., May 4-6, 1915.

Secretary, Dr. C. M. Kennedy, Des Moines, Iowa.

KANSAS STATE DENTAL ASSOCIATION, Topeka, Kans., May 25-27, 1915.

Secretary, Dr. A. L. Benton, Garnett, Kansas.

KENTUCKY STATE DENTAL ASSOCIATION, Ashland, Ky., June 8-10, 1915.

Secretary, Dr. Chas. R. Shacklette, The Atherton Bldg., Louisville, Ky.

LOUISIANA STATE DENTAL SOCIETY, Grunewald Hotel, New Orleans, La., June 3-5, 1915.

Secretary, Dr. P. Trowbridge, Franklin, La.

MAINE DENTAL SOCIETY, Portland, Me., June 28-30, 1915.

Secretary, Dr. I. E. Pendleton, Lewiston, Me.

MARYLAND STATE DENTAL ASSOCIATION, Baltimore, Md., June 11-12, 1915.

Secretary, Dr. F. F. Drew, 701 N. Howard St., Baltimore, Md.

MASSACHUSETTS DENTAL SOCIETY, Boston, Mass., May 5-7, 1915.

Secretary, Dr. A. H. St. C. Chase, Everett, Mass.

MINNESOTA STATE DENTAL ASSOCIATION, date and place will be announced later.

Secretary, Dr. Max E. Ernst, 614 Lowry Bldg., St. Paul, Minn.

MISSISSIPPI DENTAL ASSOCIATION, Jackson, Miss., April 20-22, 1915.

Secretary, Dr. M. B. Varnado, Osyka, Miss.

MISSOURI STATE DENTAL ASSOCIATION, Golden Jubilee Meeting, Jefferson City, June 10-12, 1915.

Secretary, Dr. S. C. A. Rubey, New York Life Bldg., Kansas City, Mo.

MONTANA STATE DENTAL SOCIETY, date and place will be announced later.

Secretary, Dr. F. W. Adams, Chicago Block, Billings, Montana.

NEBRASKA STATE DENTAL SOCIETY, Omaha, Nebraska, May 18-20, 1915.

Secretary, Dr. H. J. Porter, Cambridge, Nebr.

NEW HAMPSHIRE STATE DENTAL SOCIETY, Weirs, N. H., June 22-24, 1915.

Secretary, Dr. Louis I. Moulton, 15 No. Main St., Concord, N. H.

Society Announcements

NEW JERSEY STATE DENTAL SOCIETY, Asbury Park, July 21-24, 1915.

Secretary, Dr. John C. Forsyth, 430 E. State St., Trenton, N. J.

NEW MEXICO STATE DENTAL SOCIETY, Albuquerque, N. M., date will be announced later.

Secretary, Dr. J. J. Clarke, Artesia, N. M.

NEW YORK STATE DENTAL SOCIETY, Albany, N. Y., May 13-15, 1915.

Secretary, Dr. A. P. Burkhart, 52 Genesee St., Auburn N. Y.

NORTH CAROLINA DENTAL SOCIETY, Wrightsville Beach, N. C., June 23-25, 1915.

Secretary, Dr. R. M. Squires, Wake Forest, N. C.

NORTH DAKOTA STATE DENTAL SOCIETY, Fargo, N. D., May 11-12, 1915.

OHIO STATE DENTAL SOCIETY, Columbus, Ohio, December 7-9, 1915.

Secretary, Dr. F. R. Chapman, 305 Schultz Bldg., Columbus, Ohio.

PENNSYLVANIA STATE DENTAL SOCIETY, Reading, Pa., June 22-24, 1915.

Secretary, Dr. L. M. Weaver, Philadelphia, Pa.

SOUTH CAROLINA STATE DENTAL ASSOCIATION, Columbia, S. C., April 27-30, 1915.

Secretary, Dr. Ernest C. Dye, Greenville, S. C.

TENNESSEE STATE DENTAL ASSOCIATION, Sewanee, Tenn., June 24-26, 1915.

Secretary, Dr. C. Osborn Rhea, 625½ Church St., Nashville, Tenn.

TEXAS STATE DENTAL ASSOCIATION, Galveston, Texas, May 19-22, 1915.

Secretary, Dr. W. O. Talbot, Fort Worth, Texas.

UTAH STATE DENTAL SOCIETY will meet in San Francisco, Cal., during the Panama-Pacific Dental Congress in August, 1915.

Secretary, Dr. E. C. Fairweather, Boston Bldg., Salt Lake City, Utah.

VERMONT STATE DENTAL SOCIETY, May 19-21, 1915.

Secretary, Dr. P. M. Williams, Rutland, Vt.

VIRGINIA STATE DENTAL ASSOCIATION, Richmond, Va., Nov. 4-6, 1915.

Secretary, Dr. C. B. Gifford, Norfolk, Va.

W. VIRGINIA STATE DENTAL SOCIETY, Wheeling, W. Va., April 14-16, 1915.

Secretary, Dr. J. W. Parsons, Huntington, W. Va.

WISCONSIN STATE DENTAL SOCIETY, Oconomowoc, Wis., July 13-15, 1915.

Secretary, Dr. O. G. Krause, 1209 Wells Bldg., Milwaukee, Wis.

Ontario Dental Society.

A meeting of the Ontario Dental Society will be held on May 10 to 12, 1915.

DR. W. A. BLACK, Secretary.

480 Spadina Avenue, Toronto, Ont., Canada.

Fifth District Dental Society of the State of New York.

The Fifth District Dental Society of the State of New York will hold its annual meeting at Hotel Utica, Utica, N. Y., April 9 and 10, 1915.

A. C. HITZELBERGER, Secretary,
14 Hopper Street, Utica, N. Y.
J. N. GARLINGHOUSE, President.

Maryland Board of Dental Examiners.

The Maryland Board of Dental Examiners will meet for examination of candidates for certificates May 27 and 28, 1915, at the Dental Department of the University of Maryland, Baltimore, at 9 A. M.. For application blanks and further information apply to

F. F. DREW, Secretary.
701 N. Howard Street, Baltimore, Md.

Maine Board of Dental Examiners.

There will be a meeting of the Maine Board of Dental Examiners at the State House, Augusta, Me., on July 1, 2 and 3, 1915.

DR. I. E. PENDLETON, Secretary.
Lewiston, Me.

Wisconsin State Board of Dental Examiners.

The Wisconsin State Board of Dental Examiners will convene in Milwaukee at Marquette University on June 21, 1915, at 2 P. M., for examination of applicants to practice in Wisconsin.

High school diploma, application and \$25 fee to be filed with the secretary ten days prior to above date.

Dental diploma to be presented in advance of the examination.

Junior dental students presenting a clear card for two years' unconditional work from a reputable dental college, and filing a high school diploma, or its full equivalent, will be permitted to participate in the theory examination in the following six major subjects: Anatomy, Physiology, Histology, Chemistry, Bacteriology, Materia Medica. Satisfactory grades made in these subjects will be credited at subsequent examinations.

Special application blanks for this examination and \$10 fee, together with high school credits, to be filed ten days in advance.

W. T. HARDY, Secretary,
1404 Majestic Bldg., Milwaukee, Wis.
S. H. CHASE, President.

South Carolina State Dental Association.

The annual meeting of the South Carolina State Dental Association will be held at the Jefferson Hotel, Columbia, S. C., April 27 to 30, 1915.

Special public session devoted to the relationship of defective teeth to the public health.

E. C. DYE, Secretary,
Greenville, S. C.

P. D. BROOKER, President,
501 Palmetto Bldg.,
Columbia, S. C.

The Northern Ohio Dental Association.

The annual convention of the Northern Ohio Dental Association will be held in Cleveland, June 3, 4, 5, 1915.

C. D. PECK, Secretary,
Graham Bldg., Sandusky, Ohio.

WESTON A. PRICE, President.

Georgia State Dental Association.

The forty-sixth annual meeting of the Georgia State Dental Association will be held in Atlanta, Ga., at the Piedmont Hotel, June 17, 18 and 19, 1915, beginning at 11 A. M., Thursday, June 17th. We have every assurance that this will be an interesting meeting.

Every ethical dentist in Georgia is respectfully invited to attend and become a member of this organization. Also a most cordial invitation is extended to members of other associations to meet with us.

For further information address

M. M. FORBES, Secretary.
803-4 Candler Bldg., Atlanta, Ga.

Texas State Board of Dental Examiners.

The next regular meeting of the Texas State Board of Dental Examiners for the examination of applicants for license to practice dentistry in the State of Texas will be held in the High School Building, Dallas, Texas, beginning June 21, 1915, at 9 o'clock A. M.

No interchange of licenses with other States.

No diplomas recognized.

Rules governing examinations and official application blanks will be sent upon request.

All parties desiring to take this examination should send their ap-

plication, accompanied by fee of \$25, to the secretary not later than June 15th. For further information address

C. M. McCUALEY, Secretary.

434 Wilson Bldg., Dallas, Texas.

Virginia State Board of Dental Examiners.

The regular annual meeting of the Virginia State Board of Dental Examiners, for the examination of applicants to practice dentistry in the State of Virginia, will be held in the city of Richmond, Virginia, June 8, 1915, commencing at 9 A. M. For further particulars apply to

Dr. J. P. STIFF, Secretary.

Fredericksburg, Va.

Michigan State Board of Dental Examiners.

The next regular meeting of the Michigan State Board of Dental Examiners, for the examination of applicants who wish to practice dentistry in Michigan, will be held in the Dental College at Ann Arbor, beginning Monday, June 14, 1915, at 8 A. M., and continue through Saturday, June 19.

For application blanks and full information apply to

A. W. HAIDLE, Secretary.

Negaunee, Michigan.

The Kansas State Dental Association.

The next annual meeting of the Kansas State Dental Association will be held in Topeka, May 25th, 26th and 27th. This change in dates was made necessary in order to accommodate some of the essayists secured.

DR. A. L. BENTON, Secretary.

Garnett, Kansas.

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A Prophylaxis Symposium.*

Instructions to Patients in Regard to the Cleansing of Teeth.

Foreword.

Very interesting articles upon the general subject of the cleansing of teeth, herewith published, have been obtained from the writers, in a circular letter sent to a number of specialists, which was worded as follows:

Doctor:

We hear very much to the effect that a clean tooth never decays, from which course, we necessarily get the notion that the patient must keep his teeth clean. We now have a number of specialists throughout the country devoted to the prophylactic cleansing of teeth, coupled with instructions to patients how to do it at home.

I believe, however, that there is not yet any one method in common use, and that it would almost seem to the lay mind that this procedure is not so simple as it is. I would, however, that prominent specialists might agree on one way.

In order to discover to what extent the specialists disagree, I am sending this letter to several, yourself, of course, among the number, and would like very much to have you reply to the following questions, with

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permission to publish your reply along with those of the others who will contribute, so that we may get the various views in juxtaposition.

The questions are as follows:

(1) Please outline the directions which you give to patients in regard to the cleansing of their teeth. Tells us how you tell the patient to clean his teeth; that is to say, how do you describe your technique to your patient?

(2) Do you recommend dentifrices of any kind, and if so, what?

(3) Will you let me have a specimen of the brush which you think most desirable?

Contribution by Grace Rogers Spalding, D.D.S., Detroit, Mich.

I see that you, too, are laboring under a misconception with regard to the work of the specialists devoting their time to the so-called "prophylactic cleansing of teeth, coupled with teaching patients how to do it at home." While a part of the ultimate aim of our work is to prevent decay in so far as it is practical, yet our greatest ambition and desire is to produce and maintain clean, healthy and comfortable mouths, containing an efficient masticatory apparatus. We value much more the sustaining and supporting structures of the teeth than we do the crowns of the teeth. As a result of our efforts in this direction we necessarily prevent a large amount of dental caries, which is a great satisfaction, to say the least.

The operation of caring for one's own teeth is a difficult one for the average patient, and it is because it has been considered so easy that to find a well-cared-for set of teeth, even among dentists, is the rarest occurrence. I believe you will find that the specialists agree upon a few fundamental principles, viz:

1. That it is absolutely essential for a set of teeth, with the periodontal tissues, to be placed in such a condition that to keep the teeth clean will be practical.

2. That the patient should have an equipment entirely adequate in his particular case to care for his teeth and should understand how and when to use it.

3. That the equipment includes tooth brushes, ribbon dental floss, an abrasive and a mouth wash.

4. That the massage of periodontal tissues is most important.

5. That the food particles must not be allowed to remain in the mouth long enough to ferment or decompose.

Opinions will also differ as to the kind of tooth brushes, antiseptics and abrasives; also as to the method of brushing and massage. What

we wish is desirable results, which one person will secure with one set of tools and method while another can more quickly accomplish this with a totally different equipment and system. Who shall decide as to which one is right if both are obtaining satisfactory results?

In reply to your direct questions:

1. It would not be possible to give the directions which I give to patients, since each case presents problems of its own and must be taught individually. I emphasize the importance of the use of dental floss, and with this, as with tooth brushes and massage; I demonstrate the method first on a typodont, then in my own mouth, and then in the patient's mouth. Then I ask him to use the floss and brush his teeth while watching himself in the mirror before he leaves the office. If after this the patient does not keep his mouth clean it is because he has not understood instructions or because he has not made the effort, which latter is inexcusable.

I prefer the circular motion of brushing and always lay emphasis on the rule, *Never brush teeth crosswise*. Also I emphasize the importance of taking but a very short length of dental floss between the fingers, and with that under control, carefully draw it back and forth past the contact point, rubbing one surface as it enters and that of the approximating tooth as it is being drawn out. All patients need to be reminded now and then of former instructions, and a helpful plan is to have cards printed with suggestions as to the care of the teeth. The massage is done by finger pressure, rather than by surface friction, with a brush or cotton roll.

2. Tooth powder is necessary if one wishes to accomplish results with the tooth brush. It should be used largely on the molars and lingual surfaces of *all* the teeth each time a patient brushes his teeth, which should be as soon as possible after meals. I make it a rule never to recommend a dentifrice the formula of which I have not seen. We have a powder prepared for use in our practice only, containing magnesium oxide (heavy), magnesium carbonate, precipitated chalk, soap, saccharine and flavoring. Also a slightly heavier one for smokers and children.

3. A Circular brush, a sample of which I am sending you, is useful in all cases excepting where there are very short crowned teeth. Each patient should have at least two different *shapes* of brushes. The brushes should be selected to meet the needs of the case.

Contribution by Gillette Hayden, D.D.S., Columbus, Ohio.

Patients are shown the kinds of brushes they are to use and an explanation is given of those qualities of the brushes which adapt them to the needs of the case.

By personal use of the brushes and ribbon floss before the patient, it is possible to demonstrate in a pictorial way, as well as to describe the methods of manipulating the brushes and floss.

Each jaw is to be cared for separately and the gums as well as the teeth are to be brushed.

Buccal and Labial Surfaces.

Upper Jaw: 1. Place the brush, bristles up, between the occlusal surfaces of upper and lower molars on the left (or right) side, with the end of the brush touching the tissues immediately back of the last molar

2. Move the brush to the left (or right, stretching the cheek muscles sufficiently to give room for the brush to be carried between the upper teeth and the cheek. At the same time almost close the jaws, then carry the brush as high as the tissues will allow.

3. Shift the lower jaw to the left (or right) as in masticating.

4. With a rolling motion of the brush bring the bristles down over the upper teeth, at the same time opening the lower jaw in order that the occlusal surface of the lower teeth may catch the brush as it is turned down.

5. Lift the brush away from the teeth, turn the bristles up, carry the brush up high on the gums above the teeth and repeat the directions in Number 4 from twenty to twenty-five times.

Repeat this process for the buccal and labial surfaces of all teeth in the upper arch.

Lower Jaw: Reverse the direction of the brush and shift the lower jaw to the right when brushing the lower left teeth, and to the left when brushing the lower right teeth.

Lingual Surfaces from Canines Distally.

Upper Jaw: 1. Place brush, bristles up, inside the mouth, with the end of the brush opposite the last molar.

2. Put the tongue against the back of the brush and carry the bristles high up on the palate.

3. With a rolling motion, bring the bristles down over the teeth.

4. Lift brush away from the teeth, the tongue still pressed against the back of the brush, then carry the brush up high on the palate again and repeat directions in Number 3 from twenty to twenty-five times.

Lower Jaw: Reverse the direction of the brush, brushing from below upward.



Lingual Surfaces of the Six Anterior Teeth.

- Upper Jaw: 1. Place brush, bristles up, inside the mouth.
2. Put the tongue against the back of the brush.
3. Bring the brush outward against the teeth so as to bring the bristles nearest the handle end of the brush in contact with the lingual surfaces of the anterior teeth.
4. With an outward and downward motion bring all the bristles of the brush over the lingual surfaces.
5. Repeat twenty to twenty-five times, directing the brush against two teeth at a time, which are all the brush will cover in this position.

Lower Jaw: Reverse the direction of the brush and place the tongue on the end of the brush.

Occlusal Surfaces.

1. Brush backward and forward over occlusal surfaces of both upper and lower teeth.

Necks of the Teeth.

1. Place brush on the teeth so that the buccal (or lingual) cusps will fall in the centre of the bristles and lengthwise of the brush.
2. Divide the bristles by forcing half of the bristles down over the buccal (or lingual) surfaces of the teeth, leaving the other half on the occlusal surfaces.
3. With a short back and forward movement, brush carefully, being sure to carry the bristles to the gum line.

Rinse the mouth by cleansing the brush frequently with running water and brushing the teeth over again. Brush the tongue.

Have two or three brushes so that a dry one may be used each time the teeth are brushed.

Brushes so used last about two or two and a half months.

Keep the brushes well cleansed and aired.

All bone-handled brushes should be placed in cold water for six or seven hours before using them the first time.

When to Brush the Teeth.

Morning before breakfast. Brush with powder.

After luncheon. Brush with water.

Before Retiring: 1. Brush with water, or normal salt solution or powder, as the case requires.

2. Polish approximal surfaces of the teeth with ribbon floss charged with powder.

3. Rinse the mouth with clear water.

In using the ribbon floss there are three things to bear in mind, *i. e.:*

1. Keep the distance between the working ends of the fingers short ($1\frac{1}{4}$ to $1\frac{1}{2}$ inches apart).

2. Keep the floss tight.
3. Have a rest for one or both hands.

Answer to Question No. 2.

Yes. Calox powder or Colgate's powder mixed with sodium citrate in the proportion of two parts of the powder to one of the citrate. This is now being used in about 60 per cent. of cases after a year's trial by about thirty patients.

Contribution by John Oppie McCall, D.D.S., Buffalo, N. Y.

I tell my patients to brush their teeth after

First Question.

meals and before retiring for the night. They are to brush their teeth with a motion, not up and down,

nor straight across, but a compromise between the two. The brush is moved on the tooth surfaces as though describing circles with the bristles. This gets away from the objectionable straight across movement, and is easier than the so-called rolling or up and down movement. The patient is not to brush the gums, except that the gum margin should be touched by the brush sufficiently to give it a little stimulation. Such brushing will not cause irritation nor recession of the gums where the teeth have been put in proper condition by appropriate prophylactic treatment. This point must be emphasized for the benefit of the dentist as well as the laity. For the cleansing of the gums and other mucous surfaces in the mouth I prefer a rubber brush to the bristle tooth brush. The brush is supplemented by the use of a silk floss of the ribbon type. This is to be used for polishing the approximal surfaces of the teeth. Take a piece about eighteen inches in length, holding it in the two hands, so that the silk passes over the ends of the forefingers and with about an inch of free silk between the fingers. It is worked between the teeth, care being taken not to let it snap down on the gum, and is then passed in and out so as to polish both approximal surfaces. It must be carried down as far as the gum, but must not be allowed to cut into it.

The dentifrice must be regulated as to its abra-

Second Question.

sive power, according to the needs of the patient. A powder is always more effective in the dry condition

than when made into a paste. Consequently, I very seldom recommend a paste, except where the saliva is very thin, and the teeth show evidences of tooth-brush wearing. For similar reasons I do not like more than about 10 per cent. of soap in a powder, preferably less. I have no use for medicinal agents in a dentifrice. Such agents as are needed are usually only indicated while the mouth is under treatment, and are best given in the form of mouth washes, which, of course, should be prescribed by the dentist. Here are the formulas for two powders, No. 1 being a little

more abrasive than No. 2. These can be varied to suit the needs of the patient, increasing the chalk for more abrasive action, or decreasing the chalk and increasing the soap to reduce that action.

Formulas: **TOOTH POWDER No. 1.**

Castile Soap Pulv.....	Dr. 6
Sacch. Alba Pulv.....	Oz. 1
Sodium Chloride Pulv.....	Dr. 6
Oxide of Tin.....	Oz. 3
Sodium Borate	Oz. 2
Creata Precip.	Oz. 12
Oil Wintergreen	Dr. 3
Oil Peppermint	Dr. 1

TOOTH POWDER No. 2.

Magnesium Oxide Heavy.....	Oz. 8
Magnesium Carbonate	Oz. 2
Creata Precip.	Oz. 12
Castile Soap Pulv.....	Oz. 2
Sacch. Alba Pulv.....	Dr. 1
Oil Wintergreen	Dr. 3

I give to my patients the Rolling tooth brush, with

Third Question. which you are doubtless familiar, for use on the labial and buccal surfaces. On the lingual surfaces, I prefer to use a brush with a small but fairly broad clump of bristles. I am sorry I cannot send you a sample of this brush just now. It is imported from England, and the local supply has temporarily given out. Perhaps you might get one from Dr. Grace Spalding, to whom you have doubtless written. Other shapes and sizes may be used in special cases, in which the needs of the case must govern the selection.

I hope that this letter, together with the others you will receive, may result in something which will be of real benefit to the profession and the public, and assuring you that these methods have stood the test for many years.

Contribution by R. R. Johnston, D.D.S., Pittsburgh, Pa.

In brushing the teeth, begin on the occlusal sur-

Query 1. faces and brush mesio-distally and labio-lingually;

then start with the buccal surfaces of the upper teeth on either side, holding the jaws apart; place the side of the brush against the gums, roll or rotate the brush downward, using more pressure as the teeth are reached, thus forcing the bristles between the teeth. Repeat this on the anterior teeth, then on the opposite side. Then the lower teeth are brushed in the same manner, using upward stroke. The lingual

surfaces are then brushed in the same way, that is, from the gums to the occlusal surfaces, thus not only cleaning the teeth, but massaging the gums. In most mouths, by the use of the lingual brush the patient gets better results. The thorough brushing should be done upon rising and before retiring.

Flat waxed floss is to be used after each meal if possible, care being taken to pass the floss between the teeth so that it will not snap through and cause injury.

The directions are made clear to the patient by use of a typodont. If at the next appointment I find the work not well done, I have the patient brush his teeth before me and show him how to get the desired result.

It depends on the case. In some mouths water

Query 2. alone is enough; in other some mechanical cleansing agent is necessary. Then I advise the use of Calox. Kolynos, or Mogene.

In many cases the use of lime water as a mouth wash is advised, the patient being furnished with the material and directions for preparing it.

Query 3. The Rolling brush and Hutax brush, small sizes, for the occlusal, labial and buccal surfaces, and the circular brush or Hutax lingual for the lingual surfaces.

Contribution by H. C. Hamm, D.D.S., Denver, Col.

Unfortunately, there seems to be some disagreement among the specialists, but I believe that their fundamental principles are much the same.

In answer to your first question I may say that in my office I have hard bristled tooth brushes, and with one of these I demonstrate before the patient by using it on my gums and teeth, with the downward rotary motion on the gums and teeth of the upper and an upward rotary motion on those of the lower, cautioning the patient against the backward and forward use. I advise always the brushing toward the gingival margin from the mucosa, never from the coronal portion of the teeth toward the gingivæ.

I impress most emphatically the use of one brush in the morning prior to breakfasting and another in the evening before retiring, using the brush two to three minutes each time.

In regard to dentifrices I usually prescribed Pebeco, but occasionally Kolynos when the former is disliked; for a tooth powder I am partial to Calox. I try to impress upon my patients, however, that it is not what



on the brush that is so important, but the abrasive action of the
itself when used in a vigorous manner.

enclosing under separate cover samples of three brushes which
my patients to use:
all Adult Size "Rolling."
pecial "Rolling."

all Adult Size "Zel." All hard bristles.

You will note that the two larger brushes have no tufts on the ends,
er from the heel to a shorter length at the end. The reason why
this shape is because the space between the cheeks and the gums
at the posterior portion of the mouth is less than at the anterior
when the mouth is open. The Special Rolling brush is indicated
ingual sides of the upper and lower anterior teeth and the distal
s of upper and lower molars.

tribution by Andrew J. McDonagh, D.D.S., Toronto, Can.

answer to question as to what instructions I give my patients
ing a method of cleaning their teeth, I would say when my patient
to be dismissed.

I have now completed all necessary operations in your mouth, and
ur business to keep your mouth in a hygienic condition, free from
gn material and the surface of your teeth well polished. To do
necessary that you use proper instruments and use them properly.
s one thing I want to impress upon you now, and that is, it takes
venty-four hours for salivary calculus, or as you call it, tartar, to
d and become attached to your teeth. If it is disturbed during
enty-four hours by your tooth brush, or other instrument, it will
ch itself to your teeth; therefore, if after to-day you have a
of salivary calculus on your teeth, *it is your fault*.

brushing intelligently means brushing each tooth and brushing in
way that the bristles will not saw grooves in your teeth, as they
if you move your brush across the teeth; or, in other words, at
gles to the long axis. But by brushing so that the bristles sweep
aces of the teeth from the gum line toward the grinding surface,
be greatly benefited if the first part of that sweep starts on the
lf. If you will just think you are trying to *brush your gums onto*
eth it will facilitate matters, and you can do that better with a
otion than by any other way. Watch me and I will do it for you
wn mouth—(demonstration). That brushes the surface off pretty
gives the gums massage.

some of your teeth, just at the gingival margin, it is necessary
to use a circular motion to reach every part; the grinding sur-

faces also must be attended to, also the surfaces next to your tongue. I am going to show you a little brush for this purpose, it is called the Lingual Hutax brush. You place it in position similar to the brush you use for the labial or outside of your teeth, that is, with the bristles pointing downward; now with your rotary motion, keeping the lips closed, because, as you will see, the brush is made for that purpose, the handle being small at the right place, you brush the whole of the lingual surface of those anterior teeth.

"After you are through brushing your teeth you may use silk tape, such as I am showing you, or silk floss, either of which you may procure at the drug store, to polish the surfaces of the teeth, which are opposite to each other and which your brush does not reach; but be exceedingly careful in placing that floss between the teeth, as it is very apt to go through suddenly and with quite sufficient force to injure the gums.

"Now, when you have performed those functions, rinse your mouth out thoroughly several times with water. Use a dentifrice three times a week (this latter instruction, of course, depends on the patient), and brush your teeth after every meal."

In some cases I prescribe massage of the gums, in some cases I do not.

You asked what brush I used and what dentifrice I used. Of course, I use the Hutax brush, medium size, and advise it. The dentifrice I use is Hutax, either paste or powder, preferably powder. The reason I advise these, as you probably know, is that they are the product of the Canadian Oral Prophylactic Association, and all moneys obtained by the Association through their sale must go to education or charity; not one cent can be paid to any member of the Association as dividend or profits. I am sending a copy of the charter and by-laws of the Association under separate cover, and I think you will agree with me that we have it sufficiently guarded so that we cannot be accused of commercialism. We have our designs copyrighted and our Lingual Brush patented. Am sending you brushes by this mail.

Contribution by J. D. Patterson, D.D.S., Kansas City, Mo.

How should the tooth brush be used? Skill and

Question No. 1. care and not force are required to secure the best results. The most effective routine is to first rinse

the mouth with tepid water to wash away particles of food; next use the brush without powder to dislodge any particles remaining about the teeth, rinse again with water, and, lastly, use the brush with powder to better scour the teeth. The usual crosswise brushing often forces food into the spaces between the teeth, where it does the most harm. To remove it, the



brush should have bristles well apart and in uneven lengths. For the inner and outer surfaces the teeth should be brushed downward and upward; for the grinding surfaces backward and forward and from side to side; in this way all parts of the teeth can be cleansed from foreign matter. It should be kept in mind that the surfaces most difficult to reach are the ones requiring the greatest care. This very thorough brushing is required only once a day. It must be remembered, however, that some mouths and some teeth are more subject to disease than others and require greater care. More than usual care is required also during sickness.

The use of a quill toothpick and cutter's ribbon floss will remove food particles that cannot be dislodged with the brush. In using the silk, care must be taken not to unduly force the silk upon the gum and injure its union with the neck of the tooth. A similar injury can be caused by the improper use of the toothpick.

Question No. 2. Lyons' tooth powder.

Question No. 3. Patterson's tooth brush (sample enclosed).

Contribution by F. H. Skinner, D.D.S., Chicago, Ill.

Your letter of January 18th at hand. Will say from the start that I hardly know how to answer it. There are so many things required to keep the mouth of one patient clean and so few to get the same results in another. I make an effort to study the needs of each patient individually, and prescribe what I think his individual case requires.

The tooth brush and dental tape are necessary in all cases. I require each patient to have at least two different styles of brushes, one for the general cleaning and the other for the lingual surfaces of the anterior teeth. Brushes are to be used always with the rolling motion, placed well up on the gums and brought toward the incisal ends of the teeth, and the bristles should never be allowed to stab the gums.

The first thing I endeavor to do is to get all portions of the teeth, which are not covered with pericemental membrane, free from all foreign substances and to see that the surfaces are smooth and highly polished. If the tooth brush and dental tape do not keep a mouth clean for a reasonable length of time, I call a patient's attention to the neglected portions by placing in his hands a mirror and showing him the débris by applying the disclosing solution. If the teeth are not kept up to requirements, and by clean I mean so that there are no places on the surfaces of the teeth which can be stained with the disclosing solution, I try to find some way which will meet that patient's needs. The formula of this disclosing solution has been printed in almost all the dental journals in the country. If the places neglected are on the buccal or labial sur-

faces, they can be reached by rubbing with a wooden toothpick, but I instruct the patient never to injure the septal gum tissue, and also recommend rubbing the teeth with a small napkin or cotton roll.

The Carmi Lustro people are now getting out napkins specially made for this purpose, but I think a cotton roll held in the Kurooris holder, or a small pair of artery forceps, will do the same work, and so will a fresh cheese-cloth napkin or towel. A great many of my patients use the prophylactic polisher, wooden points and our entire outfit to keep their teeth clean, and use them intelligently, keeping their teeth in very good condition for six months or a year. Some patients do not want to bother with these things, so come in every two or four weeks to have their teeth gone over. My advise to these patients doing the best work is never to go more than three months without a prophylaxis treatment.

Regarding dentifrice, my answer would be to use that which the patient requires. Just a brush and water is all that some need. Where the gums are spongy and need massaging, something on a saponaceous order would be needed. There is a new tooth paste which has come out just lately, which may prove to be quite valuable to us.

The plaques which form on teeth are composed largely of protein matter. The active principle of this tooth paste is pepsin, with a base of acid calcium phosphate which acts as an activator to the pepsin; calcium chloride, which acts as an astringent, is also an ingredient.

Some patients, who are apparently unable to get the loose food off from the back teeth, are using a bathroom nozzle spray which was recommended by Dr. C. Edmund Kells, of New Orleans, an account of which was published in *Oral Hygiene* last year. I think this method of dislodging the loose food with a spray of water is very good.

Under separate cover I am mailing you one each of the three brushes which most of my patients use. Of course, where teeth have been ground down even with the gums, as in cases of removable bridgework, a smooth bristle brush is necessary, so as to not lacerate the free margins of the gingiva where it comes up near the ends of the teeth.

In conclusion, I will say that I have no fixed rule for handling patients, except, whenever I can, I use the disclosing solution to show unclean patches on their teeth. I let the patient see these and endeavor to find some way by which his teeth can be kept clean. I frequently have to demonstrate in my own mouth the instruments I would use and how I would use them, and also have the patient practice before me. I always tell him what he uses does not matter, so long as he keeps his teeth and gums clean and does not injure the teeth or soft tissues. The tooth brush improperly used does as much harm as it does good.



(The following is quoted from a paper read by Dr. Skinner July, 1913, and published in *Dental Cosmos*, March, 1914.)

"A patient should be taught how to handle a brush properly. The first brushing, when the brush is the stiffest and carries the first grit of powder, should be done on the masticating surface of the posterior teeth, in order to clean the fissures. A backward-and-forward and side-to-side motion should be used; then the brush should be placed well up on the gums, and with a rolling motion brought toward the occlusal surface, *i. e.*, up on the lower and down on the upper teeth on both lingual and buccal surfaces.

"In order to expose the lingual surfaces of the teeth to the brush, the tongue should be drawn well back. Frequently I give a demonstration to show the patient how to use the brush, and then have him practice before me until he uses it correctly. He should be careful never to prick the gums with the bristles, as they always carry infection. Patients commonly start brushing always in one place, usually at the gingival margins of some of the anterior teeth. This should be watched for and stopped, for the brush is always stiffer when first put into the mouth, and this, in connection with the first grit, if an abrasive is used, and applied in one place year after year, is sure to cause gum recession and to wear through the thin enamel of the gingival third.

"I prefer rather small brushes of medium texture. The lingual surfaces of anterior teeth can be brushed best with a small brush, which can be used with a rolling motion, because a brush of ordinary size bridges over the inside of the arch. The lingual surface brushes which are used as a hoe are sure to prick through and thus infect and injure the gum tissues. A brush never should be used more than once in twenty-four hours; therefore, enough brushes should be kept on hand to allow each one dry out before it is used again. The teeth and gums should be brushed after each meal. The chief good a tooth brush accomplishes is the removal of some of the loose débris and the massaging of the gums, which produces a hardened and healthy condition. But if a brush is not properly handled, it produces damage rather than benefit.

"Dental tape or floss should be used for polishing the approximal surfaces at least once a day. When putting this past the contact points, a short, tight hold should be taken of the tape, holding the buccal end a little higher than the lingual, so as to pass the contact points rather side-wise, thus keeping the tape from snapping down on the gums.

* * * * *

"Clean mouths and clean teeth mean a higher moral, mental, and physical development, and three-quarters of the clean-mouth campaign is won when patients have become educated so as to realize that there is irritation when there is the slightest accumulation on the teeth or mucous membrane of the mouth."

Contribution by Austin F. James, D.D.S., Chicago, Ill.

I tell my patients that there is only one thing which must be done, that is to learn to intelligently massage the gums, using the brush known as the Rolling tooth brush, laying the side against the gums and with a wrist motion turning the brush, bending the bristles as they turn, so that they slide over the gums onto the teeth.

If there are any deposits, or roughened surfaces under the gum margins, this massaging will bring out a point of irritation showing where I have failed in smoothing the root surfaces. If there has been destruction of the bone supporting the gum the damage can only be repaired by making the overlying gums recede to where there is bone to support them. This can be accomplished by the brush massage described.

Secondly, I discourage the use of abrasives and so-called antiseptics. I do, however, advise the use of a pepsin preparation which will digest all mucous films.

Contribution by Paul R. Stillman, D.D.S., New York City.

My patients are instructed in the use of the tooth brush during the whole of the last half hour of their first appointment. The first half of the hour I devote to the removal of concretions and impacted pabulum near the gingival border. This is done with scalers. When this preliminary work of hygiene has been done, I turn to the mouth toilet articles which have been placed near at hand. I say to my patient: "I have reserved this last half hour of your appointment to instruct you as to how I wish you to care for your mouth. I wish to talk to you concerning the manner of making a mouth toilet, and to teach you how you are to use your brush and at what times of the day. Ignoring the fact that you are familiar with the use of a tooth brush, I will talk to you about its use in detail, so that any point in the technique of my method, differing from your own, may be noted."

Handing the patient a new brush and taking one in my own hand, I have the patient follow me in pantomime, explaining the technique in some such way as this: "This brush is a small scrubbing brush and should always be used with that idea in mind, the free ends of the bristles always at right angles to the surface to be cleaned, using reasonable pressure and a very short circular stroke. Scrub the crown and gums of each tooth, *'one tooth at a time.'* The bristle ends must reach all the gingival border in the mouth, both buccal and lingual. Give each tooth a half dozen short, circular strokes. *Scrub as high on the gums as the brush will go. Clean all the surfaces of all the teeth.'*"

The sweeping or whiskbroom method of using the tooth brush is explained and condemned as ineffective and inefficient. The long mesio-distal sweep which is used by the vast majority of the uninstructed is condemned as injurious to the buccal and labial surfaces, and wholly inadequate for the lingual surfaces.

"This technique should be systematic. Scrub the occlusal surfaces first, with a mesio-distal sweep. Then begin at the disto-buccal angle on the upper right side and scrub that and its gingiva, proceeding from tooth to tooth toward the median line. Then scrub the lingual surfaces of these same teeth. This will complete one quarter of the mouth. Let the whole mouth be brushed in this same manner."

Each patient is given a printed card instructing him to brush the teeth before breakfast, after meals and before retiring.

Until a habit in the use of the brush has been formed, I admonish a patient to concentrate the mind upon the work, bringing the will to bear, that the work may be thoroughly done, for a bad habit can only be overcome by a combined effort of the intellect and the will.

**Answer to
Question 2.**

I invariably prescribe a dentifrice and shall continue to do so. When Dr. G. V. Black told us that plain water or lime water was all that should be used, I put a large number of patients on this treatment. My results were so disappointing that I found it necessary to restore to them the dentifrice. I found that, without a dentifrice, the mouths were not kept clean, and both stains and deposits accumulated rapidly. It is my opinion that a dentifrice is as essential in cleaning the teeth, as is soap when used upon the hands. We cannot keep really clean without either.

Of the pastes I prescribe: 1. Pyrodonto Paste; 2. Euthymol Paste; 3. Kolynos Paste; in order of preference. Others are good and so are many powders. I do not dispense toilet preparations. The proprietary dentifrices whose formulæ may be had for the asking, are more carefully and cleanly made and are of better quality than those compounded at "drug stores." For this reason I do not write prescriptions for dentifrices.

**Answer to
Question 3.**

I usually prescribe the Prophylactic tooth brush, child's size (medium). This brand is sold in separate boxes or cartons and hence not unnecessarily handled before it is sold. I also prescribe the Rolling tooth brush, infant's size (medium and soft). Also the Pyorrhœa Special (medium), same brand, but I always tell the patient not to "roll"

the brush and to disregard the printed directions. The child's size Ruberset is of the best quality of "tying," for the bristles do not shed, and the quality is excellent, but unfortunately it is not to be had in many stores, for some reason unknown to me.

The manner and thoroughness with which a brush is used is the important factor in oral hygiene.

Contribution by M. L. Rhein, M.D., D.D.S., New York City.

In reply to your request for my method of teaching oral sanitation to a patient, I would like to say a few words before answering. I suggest that it is fully understood that the mouth of the patient has been put in absolutely as clean a condition as possible, and that the patient reports at regular intervals to the prophylactic operator for prophylactic treatments. It is a very important duty of the prophylactic operator to note any dereliction in the proper brushing on the part of an individual patient. This would not prove anything more than a failure of the patient to fully grasp the method, or carelessness to fully follow directions. All the efforts of a prophylactic operator are valueless unless the patient fully understands and co-operates. It is surprising to discover how difficult it is to impart a simple method. It necessitates a kindergarten method of instruction to have the results effective.

Directions for cleansing teeth given to patient.

Question 1. Demonstrate first with a manikin, then cross-examine the patient to be sure that he has grasped the directions. Then take the patient to the lavatory and have him brush his teeth according to directions, using brush and dentifrice, the operator watching carefully and correcting any mistakes that may occur, so that he does not get into wrong habits at the outset. (Then from time to time at other sittings the patient is questioned, and if the teeth are not properly brushed, or he is neglecting any portion of the mouth, he is given practical instructions until this can safely be omitted by the patient presenting regularly a well-brushed mouth.)

In teaching the use of the brush, a systematic method should be taught. First, with a brush of suitable character, shaped so that the bristles will divide and pass over all the portion of the tooth that is intended to be cleansed, the patient is impressed with the idea that his attention is to be given to the massaging of the gums, and the teeth will be automatically brushed. *The brush, dry and clean, is dampened and the powder is placed in the palm of the hand, or on a disk, and the brush rubbed into it.* (This is advised so that all the teeth being brushed

will get their portion of the dentifrice, and not have it all go on the first surface that is brushed and be taken off there.)

Brushing Lower Teeth. Place brush flat on the gums with the points of the bristles pointing toward the chin. With a rolling motion, the brush is rotated by means of the wrist, so that, as the bristles reach the teeth, they are turned with their points toward the interproximal spaces of the teeth, and as the brush slides toward the morsal surfaces the bristles spread with fan-like shape over the entire buccal surfaces of the molars. This brushing is done in front of a mirror, so that the entire proceeding can be carefully watched. The lower jaw, on the outside, is divided into five different portions for attention. The molar region, right and left, the bicuspids and canines, right and left, and the lower incisors.

Brushing Upper Teeth. For the outside of the upper, the same manner of brushing is pursued, with the exception that the points of the bristles point upward. The five surfaces are brushed slowly, not once, but as many times as is necessary to remove every bit of débris, being sure that the brush is in the right position before starting to rotate it.

Lingual Surfaces. On the lingual surfaces the same manner of brushing is followed, with the exception of the incisors, which cannot be thoroughly brushed in this manner. Here, in addition to the rolling motion, the tuft at the end of the brush is employed, spreading the bristles in a fan-like shape over the gum below the necks of the teeth and drawing them in the manner of a hoe straight up over the incisal edge.

Morsal Surfaces. On the morsal and incisal edges of the teeth the little tuft of bristles is again used, but in brushing these surfaces the patient is warned against spreading the bristles, which may result in the gums being brushed in an improper manner. With so many surfaces of the teeth to brush, and brush carefully, the patient needs at least five minutes at each brushing. The teeth should be brushed every time after eating—after breakfast, after luncheon, and after dinner, or immediately before retiring, and each time using the dentifrice.

It is well to vary the starting place in brushing the teeth; first lower right, next time lower left, again upper right, and so on. The efficiency of the bristles is always greatest at the start, and by varying the starting place, every portion of the mouth will receive the same attention. If for any reason some particular place requires especial care, this should receive the first brushing.

**Rotary
Motion
Condemned.**

Every effort is made to guard against the so-called rotary motion of the tooth brush, because both from clinical experience and theoretically it is considered a dangerous method. Where no infections result, no harm is done, but every precaution should be taken against the points of the bristles coming into direct contact with the soft tissues. While it is admitted that with considerable skill there may be no puncturing of the gums, nevertheless the ease with which infections occur in the mouths of patients, where immunity is lacking, through brushing in this manner speaks against teaching this as a method. The fact that the gums can be pierced with impunity, and may even become semi-infected, as it were, without serious results, in the mouths of children where there is a well-established zone of immunity, is alone responsible for the use of this method. At the period in life, however, where infection is a serious matter, habits of this kind are fraught with more or less danger from infection attending their use.

**When and
How to Use
Floss Silk.**

In mouths where contact points of the teeth are normal, nothing is required beyond the above described brushing, but as soon as the contact points are not normal, it is difficult to keep the approximal spaces clean. The operator, using judgment, recommends the proper use of waxed dental floss. In teaching the use of floss, importance is laid on the fact that the floss, in passing through the contact point and into the interproximal space, *should cling to one tooth*, hugging the side of the tooth down one side, and should then be carefully taken over to the adjacent tooth, and clinging to the side of that tooth on the way up. By this means the gum will not be wounded. Improper use of the floss may cause the same kind of infection as that produced by the ends of the bristles in improper brushing.

**Mouth
Washes.**

Mouth washes are sometimes recommended, never, however, for any supposed medicinal action which they might have, but merely as a pleasing toilet adjunct. Any mouth wash that has any distinct potential therapeutic value in the cure of diseased tissue becomes a very dangerous agent in the hands of the patient.

Question 2. "Do you recommend dentifrices of any kind, and if so, what?" The theory of cleansing the enamel surfaces of the teeth from the newly plastered micro-organisms stuck fast to the enamel with mucin, but invisible to the human eye, should be the same as used by the *haus-frau* when she covers her wooden floor with sawdust, sprinkles it with water, and then



takes her broom and carefully sweeps it into a receptacle. She depends upon the moistened sawdust to carry with it the particles of dirt and at the same time to repolish the places which she is sweeping. The dentifrice takes the place of the sawdust, and its object should be practically the same. For this purpose, it is important that nothing of an insoluble nature should be used, and only the simplest medicinal agents, which should be so thoroughly diluted as to have no distinctive potential therapeutic value. If the dentist for any reason desires the patient to use locally some medicinal agent, it should be given as a separate prescription, with all the details of length of time that the prescription should be kept up. There can be no more dangerous custom than the effort to incorporate remedial agents in a dentifrice. The essence of a dentifrice should be truly prophylactic, and this presupposes a healthy mouth. The insolubility of tooth paste makes it not only less valuable than tooth powder, but in some mouths very undesirable. The tooth paste, however, has become the fashionable dentifrice because of the fact that it is more easily handled, is more attractive to the user and more profitable to the manufacturer if the same quality of materials are used. Any one of the materials in a dentifrice should be of such a nature and quality that it can be swallowed in unlimited quantities without producing any injurious effect. In considering the subject of a dentifrice, it must be at once understood that nearly every constituent that enters into its composition can be found on the market in various degrees of purity, perfection and quality. The price of any of these materials varies according to the quality that is purchased. This variation in quality makes *the prescribing of a suitable powder a practical impossibility*. It also renders unsafe the use of the average dentifrice unless the individual has a distinct assurance of the nature of the product that he is purchasing. Even then he must have additional assurance as to the integrity of the manufacturer in furnishing only the highest quality grades of the ingredients utilized. It is on this account that the writer for over thirty years has had the manufacture of tooth powder used by his patients under his own personal supervision in his own special tooth powder laboratory, which is entirely devoted to this purpose. Every ingredient passes a specified examination before it is accepted. The formula of any given dentifrice is not of so very great importance if the ingredients used are of the highest quality, and no powerful medicinal agent is employed. The criticism cannot be too strong against the dentifrice in which is incorporated a medicinal agent which will accomplish a definite purpose. The distinction must be clearly drawn between the object of a correct dentifrice and a therapeutic prescription.

Question 3. "The specimen of brush which I think most desirable." It would, indeed, be a splendid thing for mouth hygiene if it would be possible for me to send the Editor of the ITEMS OF INTEREST a brush such as I think most desirable. Although I have spent considerable time and money on this subject, the correct brush has not yet been manufactured. This statement is made advisedly after the most careful examination of every form of brush that has been exploited and which was possible to obtain.

In 1883 I introduced the Prophylactic Tooth Brush to the profession, and while recognizing its numerous defects, if this brush were properly made, according to my specifications, it is to-day the best brush that can be found for cleansing the teeth. It is a fact, however, that all bristle brushes are difficult to make *correctly* in large quantities. Only a small proportion of them can be made in the ideal shape that they should have, and the remaining lot are the poor makeshift that "seconds" always are. If any tooth brush is made with the greatest care, to give the desired results it is of the utmost importance that the handle should be as rigid as possible. In opposition to this there has been introduced by several manufacturers a flexible handle of celluloid, which entirely destroys all the merit which the brush may possess. The difficulty of obtaining sufficient quantities of bone in the proper shape is the only reason for the utilization of the flexible handle. The prophylactic brush ceases to be a type of "*The Prophylactic*" tooth brush which I designed when it fails to have a rigid handle with the proper curvature. Whatever tooth brush is used, several things are necessary to make that tooth brush a really efficient tool.

The individual should always have a sufficient number of absolutely clean brushes in use. A brush in which the bristles remain limp from not being thoroughly dried is valueless until the bristles have regained their normal elasticity after being thoroughly dried. It is useless to take all the time and care for correct brushing if the bristles fail to have the required amount of elasticity. The great value of the hole in the handle consists in permitting the brush to be suspended in such a way that every portion of the bristles in sight is surrounded by a current of air, and by virtue of this the bristles are dried much more quickly than by any other method. Each tooth brush should be used but once a day. The breakfast brush should not be used again until after breakfast the next day, and so with the other brushes.

**Cleansing
the Brush.**

After using the brush it must be *thoroughly cleansed* before hanging up to dry. This cleansing must not be perfunctory, but of the most thorough nature. It is wise to have reserve brushes suspended



over the wash basin; it may happen that the brush selected fails to respond to the proper test, and is not doing its full duty. It should at once be discarded and one of the reserve brushes substituted.

There are exceptional mouths that frequently require special direction and care in order to enable the individual to keep the different surfaces of the teeth properly cleansed and polished. It is impossible to close this statement without referring to the great amount of damage that is done by individuals who attempt too often, under professional advice, to supplement directions of this kind by more rigorous activity, which should only be performed by the prophylactic operator. Port polishing holders, for which points and instruments have been devised for the use of patients, are to be especially condemned. Criticism against anything of this nature cannot be made too strong.

Mouth Hygiene Directions.

By JULES J. SARRAZIN, D.D.S., New Orleans.

Many systemic disturbances find their origin in infectious bacterial films not properly removed from necks of teeth. Nothing short of approximal polishing floss tape and *dry* powder with an active, smooth, polishing grit, on *dry* stiff bristles, will thoroughly break up such films and develop the polish on tooth structure which protects against their adherence. Dry bristles alone are, in comparison, ineffective, and soap in a paste deludes by lubricating them. Grooves are worn at gingival lines by crosswise, horizontal brushing; not otherwise. Resting on these fundamental facts, *directions to suit their respective mouth conditions* are given Mr. and Mrs. John Doe by plain words illustrated with objects and photographs, they being made at the same time to realize the *protective training* which they owe their *children*. *Patients carry out instructions better if they are made to thoroughly understand their foundations and far-reaching importance.*

"Cavities in teeth are formed as a result of food

**To Mr. and Mrs.
John Doe:** remnants allowed to remain between teeth and in their depressions (Figs. 1 and 2). The greatest harm is done during sleep, while the mouth is at rest, but fermentation and decomposition of food remnants start within two hours after eating, unless proper mouth cleansing is done after meals, besides doing it at bedtime. Cavities thus started hold infectious germs dangerous to health. Food then becomes contaminated by the very act of chewing it. Teeth are destroyed until abscesses result which infect the blood circulating around their roots. You and your children should never re-



Items of Interest

tire without having thoroughly cleansed your mouth according to directions. Additional cleansing increase in importance according to the number of hours before bedtime. After-breakfast mouth hygiene is therefore the next necessity, while an afternoon repetition of it is exceedingly desirable.

"Mrs. Doe's mouth shows a moderately advanced condition of Riggs' disease. (Fig. 3 shows advanced stage of Riggs' disease.) It is simply



Fig. 1.



Fig. 2.



Fig. 3.

a question of time for it to reach a desperate phase unless conditions are now completely changed, and she conscientiously helps so doing. As adjuncts to dental chair treatment she needs the germicidal, astringent, pus solvent and alterative properties in Vident No. 6 Mouth Wash; the abrasive remedial effect in Vident No. 4 Powder; and Vident Polishing Floss Tape No. 9, because her teeth have lengthened, due to the loss of gums resulting from the diseased condition. I am partial to Vident preparations because the different ones supply the properties needed in various conditions, and because, being made from my own formulae, the constituents of which appear on packages, I know exactly what effects to expect from them, if properly used according to directions. If the

diseased condition in Mrs. Doe's mouth is not corrected locally, and the systemic effects remedied which already begin to show as a result of the infection which her blood is taking therefrom, we may expect morbid developments to follow gradually, such as are mentioned in the list displayed (Fig. 4).

"Of course, this is of still greater importance than the preservation of her teeth. Her health could be safeguarded by sacrificing her teeth, or

FREQUENT RESULTS OF ORAL INFECTION:

By CONTIGUITY: Pharyngitis, Glossitis, Tonsilitis.

By MOISTURE GLOBULES { Laryngitis, Bronchitis,
Bronchial Catarrh.

By INGESTA { Gastritis, Septic Gastritis, Gastric
Erosions and Ulcers, Diarrhea, Intes-
tional Toxemia, Appendicitis.

By CIRCULATION { Arthritis Rheumatoid and Deformans,
Gout, Rheumatic Fever Anemia, Septic
and Pernicious Anemia, Lowered Sys-
temic Resistance to all forms of
Infections, Neurasthenia, Bright's
Disease, Abscessed Liver, Infectious
Endocarditis, Cerebro-Spinal Dis-
turbances, Cerebral Venous Conges-
tions, Cerebellum Affected,
Death.

Fig. 4.

most of them, but it is still possible to save both, provided that she will faithfully co-operate by proper home mouth hygiene treatment, which we will presently plan out to suit the whole family, backed by such special preparations as individual conditions require. In her case, in addition to general directions to suit everybody, she must practice gum massage at least every three hours, pressing the gums in the directions shown by arrows (Fig. 5), so as to repulse toward the heart the surface blood already infected by septic matter in the sockets, and allow the tissues being fed by arterial blood from beneath. This applies to both jaws, throughout, and at least five minutes should be devoted to each. Ultimately, as far as the teeth themselves are concerned, whether in young, old or diseased mouths, proper care must polish them until they become lustrous (Fig. 6) in between them as well as on their visible aspects, so that deposits of no kind tend to adhere to them anywhere, and still more especially at gum lines. This constitutes the prevention of caries and Riggs' disease.



Items of Interest

"In your mouth, Mr. Doe, we must correct the effect of carbon stains from smoking and the resulting irritation to mucous membranes. Vident Powder No. 3 will take care of stains and supply the polishing, provided that you use it *dry*, as all powders should be used. Vident Mouth Wash

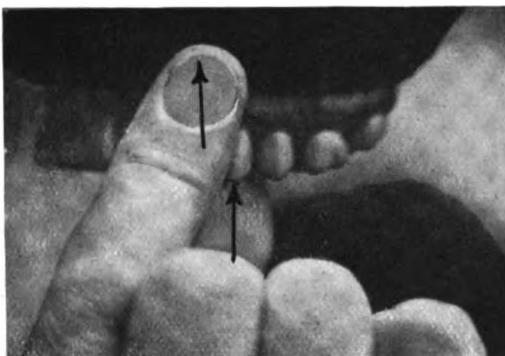


Fig. 5.



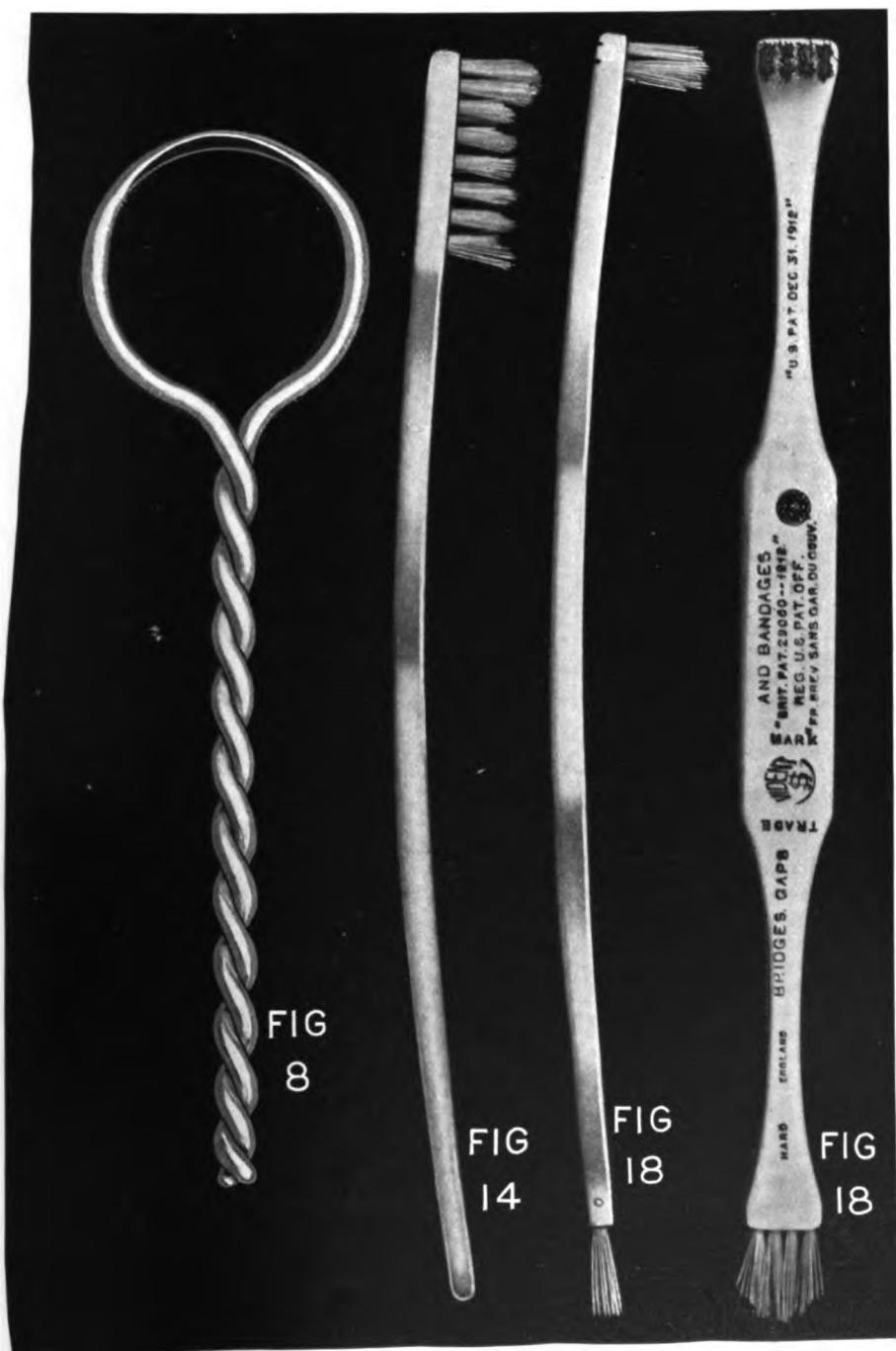
Fig. 6.



Fig. 7.

No. 5 will tone the gum tissue, and, as your teeth are not too long, you will polish between them with Vident No. 8 Polishing Floss Tape.

"Ethel, who is five, should begin using *dry* powder on a *dry* brush, but she needs no more active polisher than Vident No. 2 Powder, and she must use Polishing Floss Tape No. 7, which is narrower. Other-



wise, all the general mouth hygiene directions we are coming to apply to her also.

"The training of little Sam, who is two years old, must now be started, but with No. 1 Vident Paste, which contains no soap to prevent polishing; his mother will have to use this on a double end brush, the hoe end of which must be cut shorter for him, and the small extremities of which will not crowd his mouth. He would choke on a powder. Gradually, by letting him imitate the whole family at floss tape rubbing, he will grow into that proper habit.

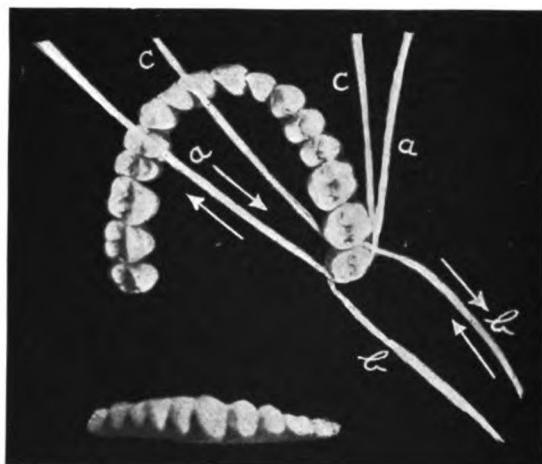


Fig. 9.

"For the new baby, as each tooth emerges, keep it cleansed with an eye brow brush three times a day. Temporary teeth must absolutely be preserved in good condition, else the development of the child suffers both locally and systemically, and later, permanent teeth become seriously impaired and prone to caries, irregularities, and, in adult life, Riggs' disease also results.

**Technique
of Thorough
Hygiene.**

"Now that the special conditions in each mouth are provided for, we will take up the thorough technique of proper mouth hygiene. The first step is to thoroughly cleanse the back of the tongue, near its root, from filmy deposits, which would otherwise re-infect the mouth within a few minutes after the mouth toilet (Fig. 7). In so doing the tongue usually furrows down in the centre, and this is overcome by then scraping with the polished, blunt, rounder lip of the tongue cleanser (Fig. 8, page 345, cleanser, full size). Tendency to gag is corrected by drawing the tongue out by its tip; taking a deep breath



at the same time. The children need not use a tongue cleanser until they are ten years old.

**Use of
Tape Floss.**

"Next, floss polishing tape must be thoroughly rubbed against the neck of each tooth in the mouth, on its front and back; *not merely passing it between the teeth*. This is difficult and demands very *special*



Fig. 10.



Fig. 11.

care on the front of all back teeth, both above and below; otherwise the spots become starting points of infection and disease. At those places the floss polishing tape must be tightly wrapped on the tip of one index finger, only three quarters of an inch of it being stretched out by the other forefinger, so that the front of a rear molar can be encircled and properly polished. (Fig. 9 shows use of tape. Similar letters mark two ends of same tape, and arrows indicate direction of movement back and



forth when using.) For rubbing into depressions at the front necks of some of her molar teeth, which I will point out to her, Mrs. Doe will have to tie knots in her floss polishing tape. Rub still more against teeth which stand next to empty spaces, because they otherwise accumulate more septic filth than others; it is readily pushed thereon in chewing, and by the tongue and cheeks. Polishing floss tape must be entered

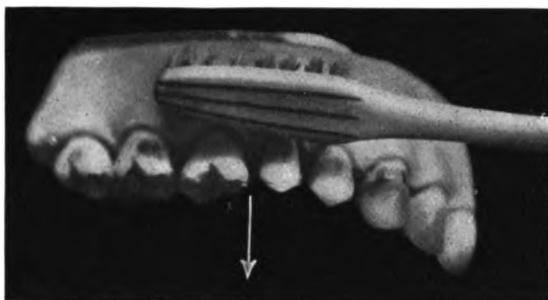


Fig. 12 A (Proper Brush Motion).

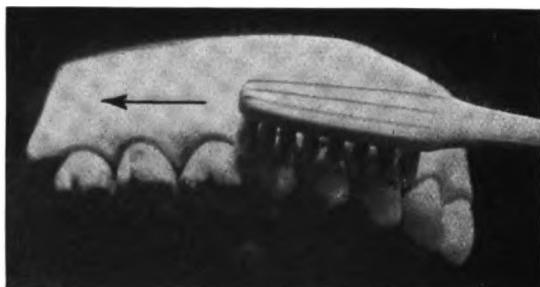


Fig. 12 B (Harmful Brush Motion).

between teeth by a sliding motion until it merely touches the gums, and it must be rubbed separately against each tooth, but not into the gums, which it may, however, touch in so doing. The object is to polish the necks of the teeth, between them.

**Use of
Tooth Brush.** If Mrs. Doe's house girl went on a holiday for a week, she might have to sweep some flooring. She would surely do so with the length of the boards, to remove all the dirt possible (Fig. 10), and not across them to pack it into interspaces (Fig. 11).

"Likewise, in brushing teeth, bristles must move from far on the gums to biting surfaces of the teeth (Figs. 12A and B). In so doing venous blood circulation in the gums is stimulated, while the interspaces between



Fig. 13.

teeth are reached as far as bristles can do so, crowning no septic filth therein instead of removing it. It requires the fingers moving as already explained to message gums, but stimulation by the brush gives some help. Proper vertical motion of bristles from the roots of teeth to biting surface must be done *inside* as well as *outside* the teeth, *above* and *below*,



Fig. 15.

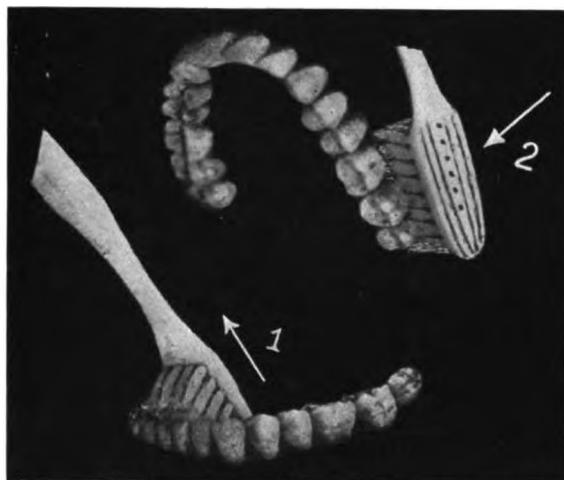


Fig. 16 A.

front and rear. What is more, *improper, crosswise, horizontal brushing* has three harmful effects: It crowds disease-causing material between teeth; it irritates and pushes away the gums; it wears grooves into the teeth.

"A nail brush moves freely in a wash bowl, but a tooth brush somewhat resembling the former in general size and shape crowds the mouth so as to prevent proper motion of bristles. (Fig. 13 shows proportionate

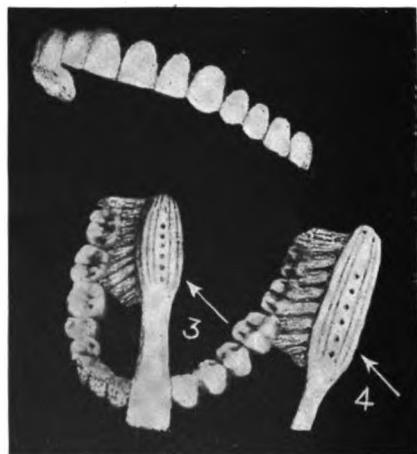


Fig. 16 B.



Fig. 16 C.

difference in size between the nail brush style of tooth brush, and the Vident tooth brush. Fig. 14, page 345, shows actual size of brush.) The larger brush is a useless tool, defective in every particular, calculated to delude its user with the idea that bristles act because they crowd. It might clean flat silverware. A narrow brush head, no longer than one and one-eighth inches, with rows well spaced apart, also adapts itself to



Fig. 16 D.

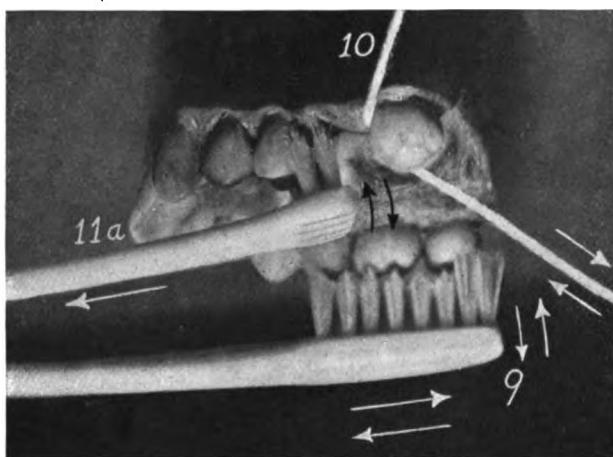


Fig. 16 E.

the tongue side of teeth, inside the lower molars and elsewhere, as well as behind molars on their cheek side, both above and below. The long extremity cluster must always be well felt on the gums behind all rearmost molars. Except to tighten its bristles as first put to use, never wet your brush until you are through with it. Then, most thoroughly rinse all powder out of it.

"While brushing your gums and teeth, wipe the brush every time it becomes wet by saliva, and, each time, charge it with a quantity of *dry* powder from a small glass held slantingly (Fig. 15).

"There are places where brushing should be started while bristles are at their best after drying. Therefore, do different places in the order

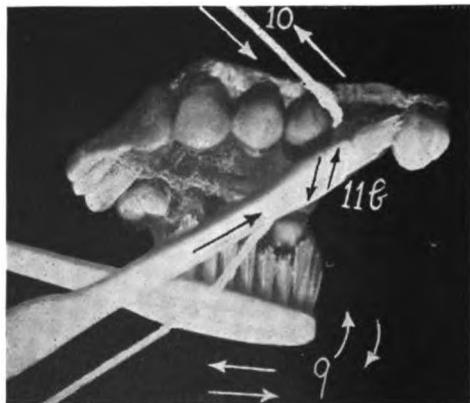


Fig. 16 F.



shown, and with the motions of bristles illustrated, repeating them on each side of the mouth, and every time with a heavy, fresh charge of powder (Fig. 16).



Fig. 17.

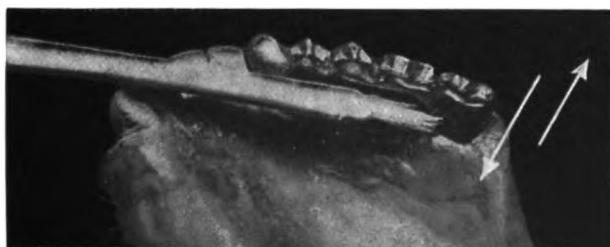


Fig. 18.

"No special attention need be given the cupid regions, above, below, in and out, because the neighboring motions of bristles will readily bring them there. All that is necessary is to repeat fresh charges of *dry* powder in these localities, as elsewhere throughout the mouth. Finally, with still another charge of powder for each place on both sides, above and below, brush the chewing surfaces of molars as shown (arrows 9).

"No places are as treacherous for harboring disease germs as the necks of teeth next to empty spaces and beneath bridges. You could not be induced to eat with a fork displaying a small fraction of the septic

filth usually found there. The necks of teeth next to the empty space in Mr. Doe's mouth require special polishing floss tape rubbing and heavy charges of powder on each end of the double end brush in turn (Fig. 17. In Fig. 18, page 345, is seen Vident Double End Brush, actual size), as shown by black and white arrows 11a and 11b.

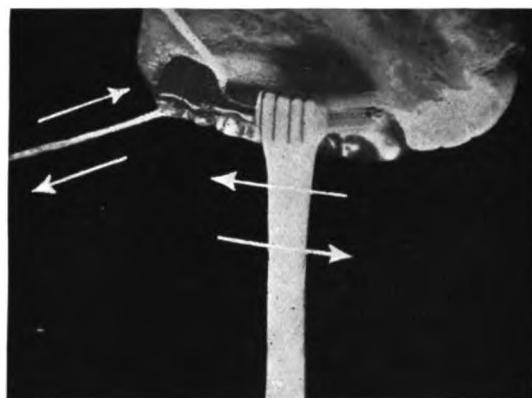


Fig. 20.

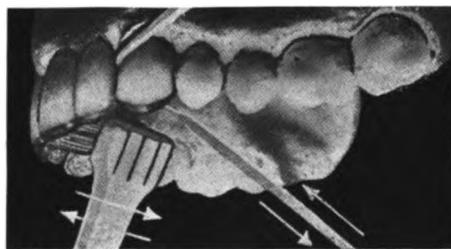


Fig. 21.

Care of Bridge-Work. "His right, lower bridge must also be cleansed as his left, upper empty space, in every particular, making especially sure that the polishing floss tape is threaded beneath the bridge, and thoroughly rubs against the crowns at both ends of it, and where the straight end of the double end brush is applied, use special pains (Fig. 19).

"Mrs. Doe's left, upper bridge requires identical vigilance throughout ; tape rubbed beneath it and carefully against both extremities ; increasing care against the rear crown, charging powder generously on both ends of the double end brush to work against each crown successively (Fig. 20). Mrs. Doe must also do thorough work beneath her upper, front bridge (Fig. 21). Difficulty thereat is increased because the span teeth



rest on the gums. She must thread the polishing floss tape as shown, thoroughly rub against one crown, rub beneath all span teeth, reach the opposite crown, and rub thereon also. Afterwards, heavily charge the hoe end of the double end brush with *dry* powder, and polish the gold surfaces next to the gums, reaching the end crowns carefully.



Fig. 22.



Fig. 23.

"When lower, front teeth are long, like Mrs. Doe's (Fig. 22), and still more, when they recline toward the tongue like Mr. Doe's (Fig. 23), even the short narrow head brush tends to ride over the edges of the lower front teeth and the gums under the tongue, completely failing to break up deposits which rapidly form at teeth necks. Make use thereof of the hoe end of the double end brush, charged with *dry* powder a couple of times.



"By the way, when a regulating appliance is put in Ethel's mouth, she will be obliged, as an additional adjunct, to use both ends of the double end brush, well charged with *dry* powder, reaching the teeth everywhere inside of all wires.

**Use of
Mouth Wash.**

"The last step in mouth hygiene consists in flushing out the tiniest particles loosened and floating about with a mouth wash properly suited to special conditions. Use it no stronger than twenty per cent. in water. Force it vigorously in every direction with tongue and cheeks for two minutes; finish by gargling.

"To protect your teeth, your gums and yourself against disease, it is a question of ever breaking away and removing the slightest infectious film which may be developing anywhere in your mouth, and maintaining a perfect polish on all the different surfaces of your teeth. Beneficial results accrue in direct proportion, both locally and systemically. We shall frequently make use at the chair of a germicidal staining solution to reveal the slightest spot where your efforts need to be directed with special care in addition to the general technique of mouth hygiene just explained."

Instructions for the Home Care of the Mouth.

By ALFRED C. FONES, D.D.S., Bridgeport, Conn.

It is possible to remove all of the food débris from the teeth if the following details are carefully observed:

First—Brush the teeth with clear water upon rising in the morning, and after each meal with a dentifrice.

Second—Follow the brushing after meals with the use of floss silk in all inter-tooth spaces.

Third—Complete each cleansing by rinsing the mouth thoroughly with lime water.

How to Brush the Teeth and Gums.

The mouth should be cleansed in four sections:

First—The outside surfaces of the teeth and gums of both the upper and lower jaws.

Second—The inside surfaces of the lower teeth and gums.

Third—The inside surfaces of the upper teeth, the gums, and the roof of the mouth.



Hold of brush for
left side.

Fig. 1.

Show ing circular motion given brush on left side and in front on teeth and gums.

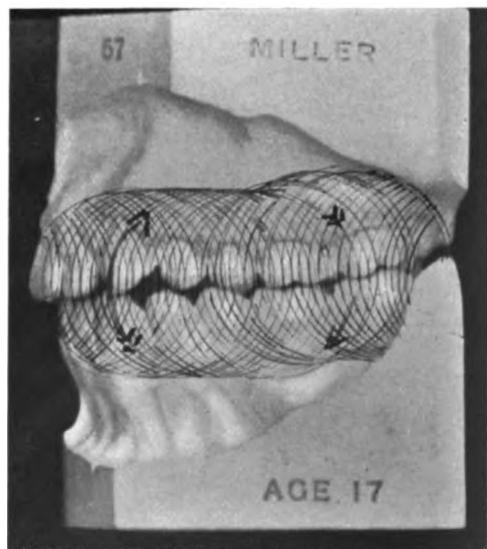


Fig. 2.



Hold of brush for
right side in brushing
outside surfaces of
teeth.

Fig. 3.

Circles in which
brush should travel
on right side.

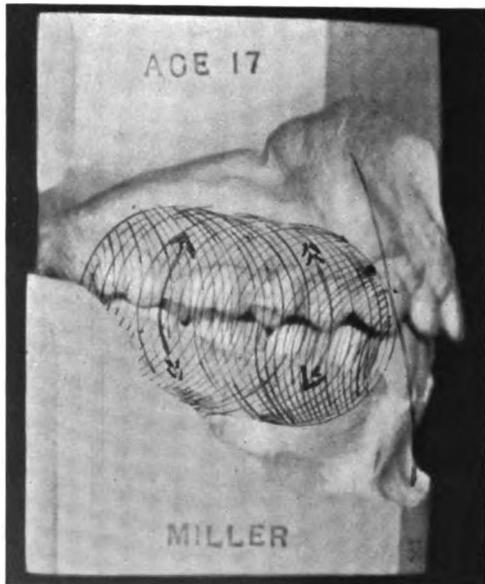


Fig. 4.



Fig. 5.

Hold of brush for inside surfaces of lower
teeth and gums

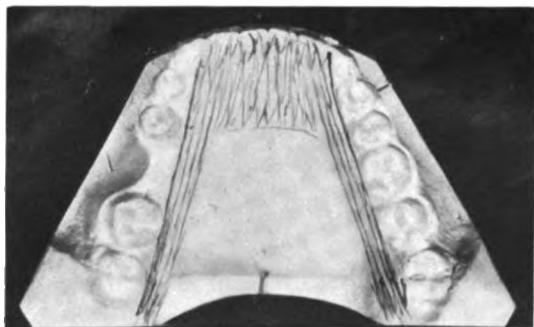


Fig. 6.

Lines indicating the direction brush should
travel.



Fig. 7.

Hold of brush for inside surfaces of upper teeth
and roof of mouth.

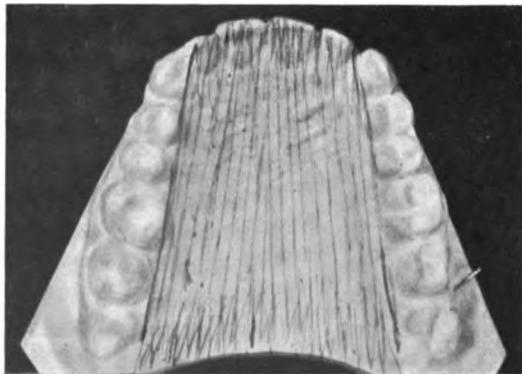


Fig. 8.

Lines indicating the direction brush should
travel.



Detailed Instructions for each Section.

First—The outside surfaces of the teeth and gums.

Place the toothbrush inside the *left* cheek and on the upper gums, well back in the mouth. Nearly close the teeth, moving the lower jaw forward if this is necessary to make the front teeth meet. Hold the brush as shown in Fig. 1.

Make the brush go backward and downward to the lower gums, then slightly forward and upward until it has traveled a complete circle. This circular motion should be a light, rapid one and continued forward until all the teeth on the left side and front have been brushed. (Fig. 2.)

Do not brush the teeth or gums crosswise.

Then change the grip on the brush to that shown in Fig. 3.

Brush the outside surfaces of the teeth and gums of the right side using the same circular motion, reversing the direction of the circle if this is found more convenient. (Fig. 4.) Brush long enough to thoroughly stimulate the gums and cleanse the teeth, going back and forth over all these surfaces several times.

Second—The inside surfaces of the lower teeth and gums.

With the same hold on the brush as for the right side, outside surfaces (Figs. 3 and 5), brush the inside surfaces of the lower teeth and the gums with an in-and-out stroke (Fig. 6), using chiefly the tuft end or toe of the brush. It will be noted that it is easy to reach the left side, but for the front and right side the wrist must be bent downward at a sharp angle, similar to the position of the bow hand of a violinist, and the elbow raised. Be sure to reach back in the mouth on the gums below the last tooth on both sides and also to brush the gums back of the lower front teeth.

Third—The inside surfaces of the upper teeth, the gums, and roof of the mouth.

With the bristles of the brush pointing upward and the end of the thumb on the back of the handle (Fig. 7) brush the roof of the mouth and the inside surfaces of the teeth of the upper jaw and the gums about them with a fast, light, in-and-out stroke (Fig. 8), reaching back on the gums as far as you can go. Go back and forth across the roof of the mouth at least four times.

Fourth—The chewing surfaces of the teeth and the posterior ends of the arches, upper and lower.

Holding the brush as is most convenient, brush the grinding surfaces of first the upper and then the lower teeth, using the in-and-out motion.

Lastly, with a sweeping motion, cleanse the teeth at the ends of the upper and lower arches (the last molars) and the gums about them.

After brushing, the mouth should be examined with the aid of a hand mirror, pulling the lips away from the teeth, and if any food is found, brushing should be continued until it has been removed.

Either a powder or a paste may be used on the brush.

Brushing must be continued for at least two minutes. This means two minutes by *the clock*.

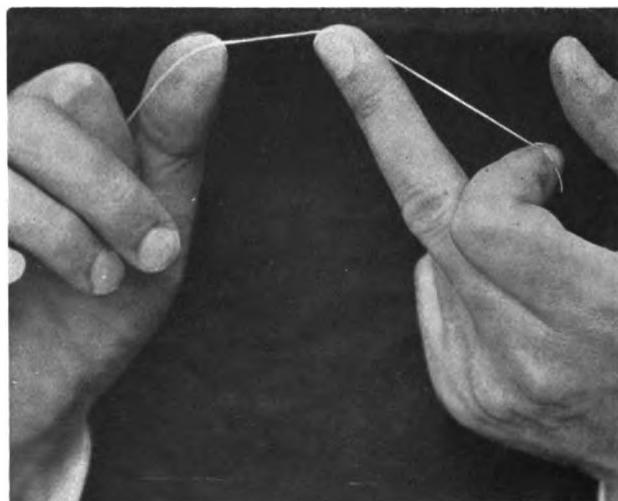


Fig. 9.
Hold of floss for right upper teeth

Do not use pressure with the brush.

Get a new tooth brush frequently. Notice that these are specially cut brushes and should be duplicated.

Candies, sugar, cake, pastries, crackers and bread are especially apt to decay the teeth if allowed to remain on their surfaces.

How to Use the Floss Silk.

There is but one way that is effective in removing the food from between the teeth and that is with a piece of floss silk or dental floss, as it is called.

Use a section of floss about twelve inches long. Hold one end between the thumb and first finger of the left hand and wrap the floss twice around the end of the first finger. Do the same with the thumb and first finger of the right hand. Now by using combinations of the ends of the thumbs and second fingers (Figs. 9, 10 and 11), the floss

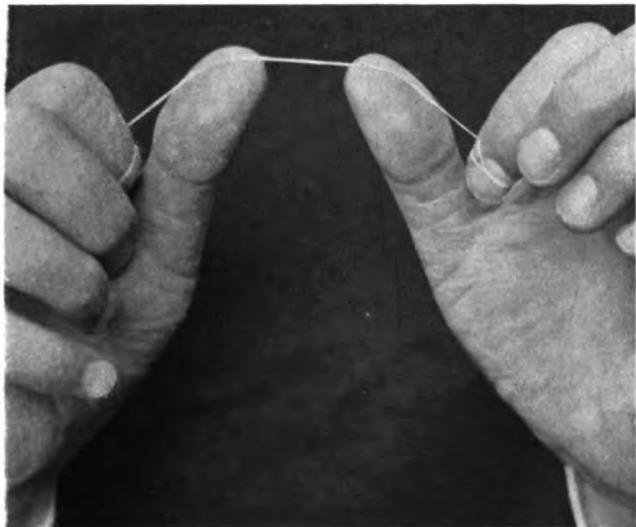


Fig. 10.
Hold of floss for left upper teeth

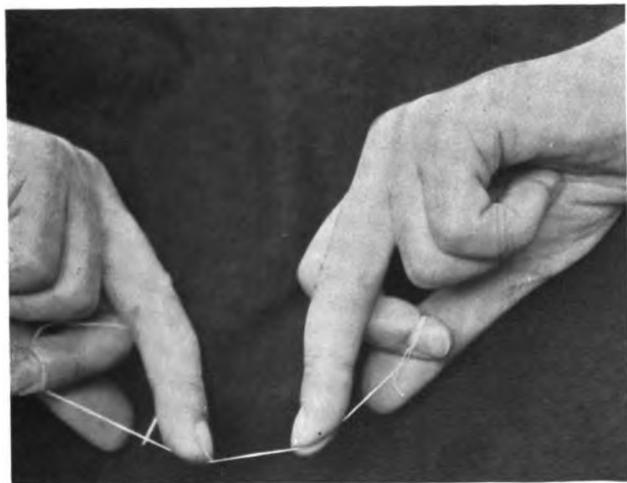


Fig. 11.
Hold of floss for lower teeth

may be carried into the mouth and forced carefully between all the teeth, care being exercised not to injure the gum in so doing. Rub it back and forth against the surfaces of each tooth to loosen and remove the food to clean these surfaces. After a little practice one can floss all the surfaces between the teeth in a very short time.



Fig. 12.
Lime water bottles

The Use of Lime Water.

Lime water is very important and is advocated for two purposes: First—to wash away food débris, and Second—to dissolve a glue-like deposit from off the teeth. This is called mucin and is the material that protects the germs that are active in food fermentation.

How to Make Lime Water.

Secure from a paint store five cents worth of coarse, unslackened lime and crush it into a fine powder. The refined lime that the druggists sell does not seem to have the same solvent action.

Place a half cupful of the powdered lime in a quart bottle and fill nearly full with cold water. Thoroughly shake and then allow the undissolved lime to settle at the bottom of the bottle, which will require several hours (Fig. 12).

After the lime has settled, pour down the sink as much of the clear water as you can without losing any of the lime. This water is



poured off because it contains the washings of the lime and is not pure enough to be used.

Again fill the bottle with cold water, shake well and allow the solution to clear itself. After the lime has again collected at the bottom of the bottle fill a twelve-ounce bottle with the clear solution of lime water, being careful not to stir up the lime at the bottom. The twelve-ounce bottle is used as it is easier to handle at the wash bowl. Refill the large bottle with cold water, shake well and set it aside to use when the smaller bottle has been emptied. This process may be repeated until all the original half cupful of lime has been completely dissolved.

How to Use the Lime Water.

After brushing and flossing the teeth, pour out a little of the lime water into a glass and, taking it in the mouth, force it back and forth between the teeth with the tongue and cheeks until it foams. When it begins to foam this shows that it has been in the mouth long enough to have a beneficial action on the teeth. Now rinse out the mouth with clear water.

If the lime water is a little strong at first then dilute it about half and half. It should be used full strength, however, just as soon as the gums have become hard and healthy under the rapid, light brushing.

With the use of the lime water the toilet of the mouth is complete. The actual time required for the care of the teeth amounts to fourteen minutes daily. Faithfulness in mouth cleanliness will not only prevent dental diseases but will prove to be a valuable insurance for health. You are the only person who can save your teeth. Will you do it?

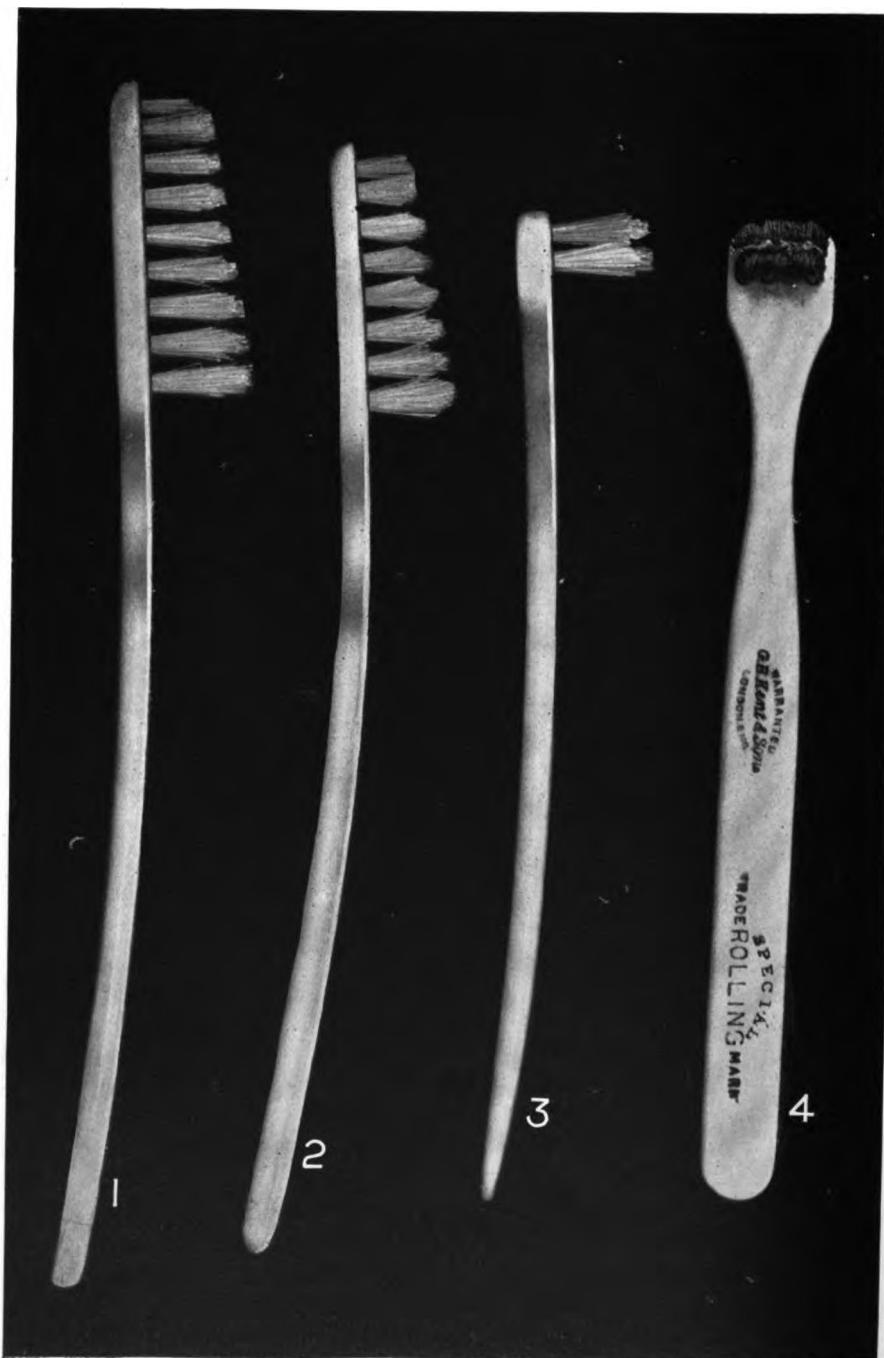
Prophylaxis During Orthodontic Treatment.

Contribution by Dr. R. Ottolengui, New York.

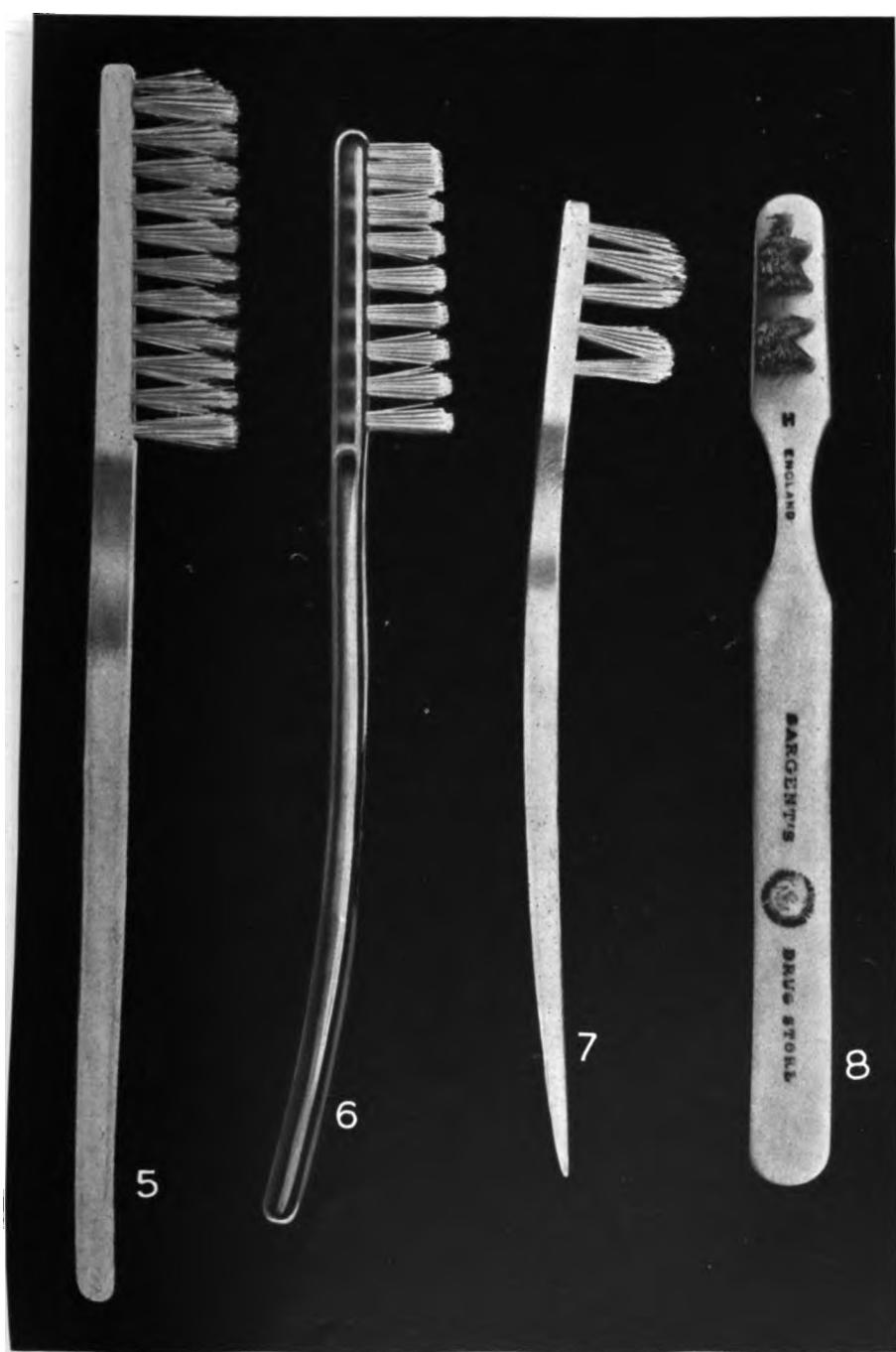
The general practitioner is very prone to complain that much damage may be done to the teeth of children during the treatment of their teeth for the correction of malocclusion. Dr. Clarence Grieves in his classic thesis on this subject (*ITEMS OF INTEREST*, May, 1909, page 326) conclusively proved that the danger is very real if appliances be carelessly constructed and unhygienically worn. The true orthodontist therefore utilizes the period of orthodontic treatment for the thorough inculcation of habits of mouth hygiene, and his child patients are carefully drilled in the use of the tooth brush.

Dr. Lawrence Baker, of Boston, has devised a carrier for port polisher brushes (see No. 14 of tooth brush illustrations) which has the advantage of carrying brushes which are small, and so cheap that they may be renewed daily. For general tooth cleansing the writer likes a brush of the general shape of the Prophylactic, of small size and medium stiff bristles. In addition to this he recommends the Rolling Special (see No. 3), and the children are carefully instructed in the cleansing of the teeth which are banded, and the appliances as a whole.

Items of Interest



Exclusive Contributions

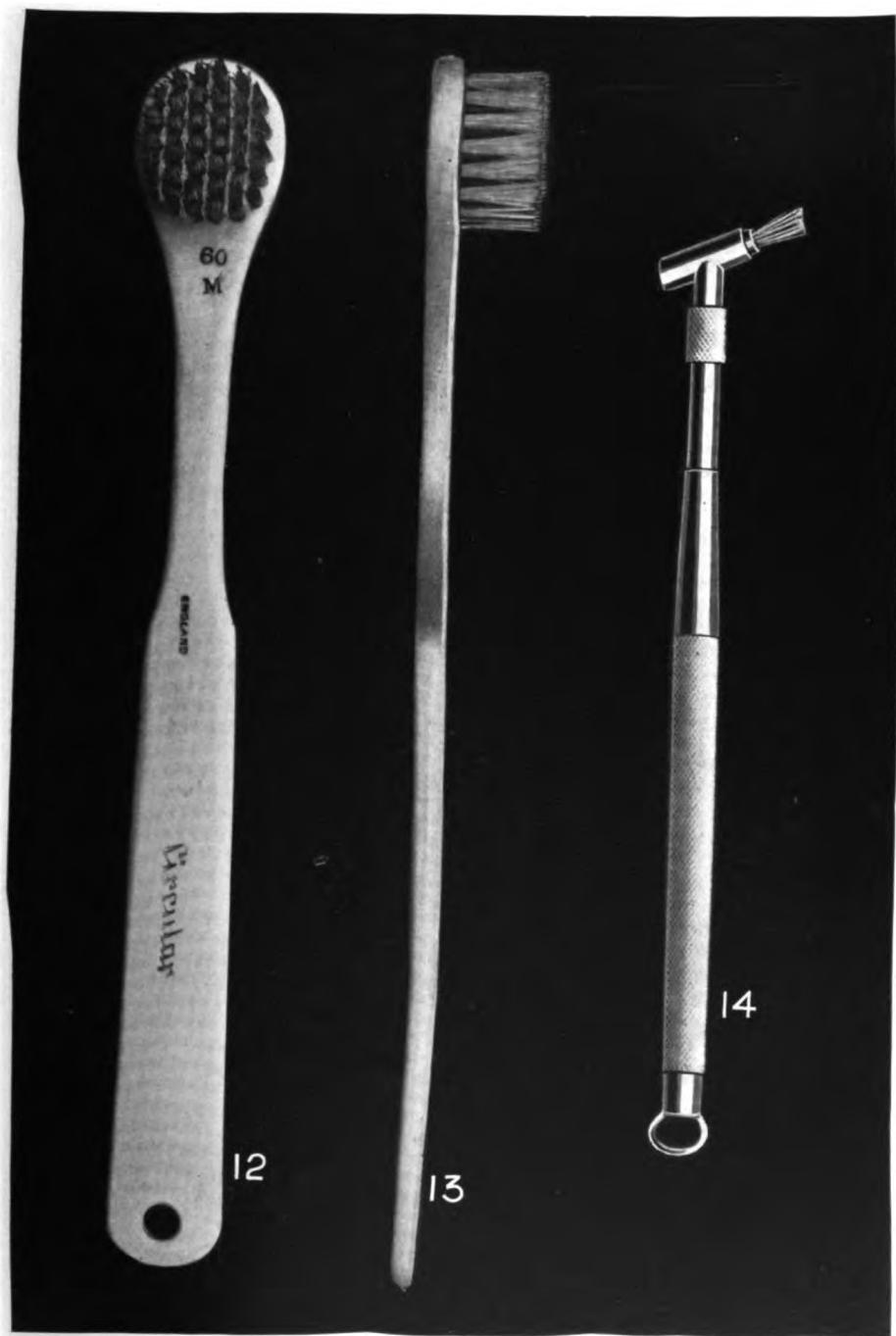


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May

Items of Interest





Items of Interest





Description of Tooth Brush Illustrations.

The illustrations are from photographs taken to show exact size, so that the reader, by comparison, may comprehend what size and style of brushes the various writers recommend.

Large and small sizes of the Rolling tooth brush.

Nos. 1 and 2. These have bone handles. They are recommended by Drs. M'Call, James, Johnson, Hamm, and Stillman, the latter advising only the smallest size.

Two views of the Rolling special, with bone handle.

Nos. 3 and 4. Advised by Drs. Hamm and Stillman. Dr. Ottolengui particularly recommends this little brush for children wearing orthodontic appliances especially the new Angle appliance.

No. 5. Dr. Patterson's brush. Bone handle.

Dr. Hamm's Perfect brush. This has a fairly rigid celluloid handle and is manufactured by the company which uses the trade mark "Zel."

Nos. 7 and 8. Two views of Dr. Skinner's Lingual brush. Bone handle.

Nos. 9, 10 and 11. The Hutax brushes. These are the product of the Canadian Oral Prophylactic Association. They have bone handles, and are recommended by Drs. Johnson and Donagh.

Nos. 12 and 13. Two views of the Circular brush. Bone handle. Recommended by Drs. Spalding, M'Call and Johnson.

No. 14. This shows a metal carrier for port polisher brushes, devised by Dr. Lawrence Baker for children wearing orthodontic appliances.

No. 15. The Laroma, designed by Dr. A. C. Fones, and made for him by the "Zel" brush concern. Has a fairly rigid celluloid handle.

Nos. 16 and 17. The Prophylactic tooth brush. Both celluloid and bone handles are shown. Dr. Rhein, the designer of this brush, advises against the celluloid handles which are so thin that they are too resilient in his opinion. Dr. Stillman recommends only the smallest size, No. 17.

No. 18. The Ruberset brush, of the size recommended by Dr. Stillman. The handle is of some composition not so rigid as bone, but more so than most of the transparent celluloid handles. The brushes recommended by Dr. Sarrazan are numbered to agree with references in his text.



What Shall We Do with the Tooth Brush?

By ERNEST C. DYE, A.B., D.D.S., Greenville, S. C.

Bacteriologists have proven that the tooth brush as it is now used "Is in a disgusting state of uncleanliness," "and is capable of spreading all sorts of disease." Does it not seem rather queer that we preach "mouth hygiene" from the press, the rostrum, and in our daily practice, and yet we allow that instrument (the tooth brush), with which the patient carries out our instructions, to practically go unnoticed? Anti-septic tooth pastes and powders reduce some of the organisms found on the brush, but they are not sufficient. Shall we discard the tooth brush? If we do, will not a worse condition follow?

Dr. D. W. Carmolt Jones and Mr. Herbert Smale, of London, in 1910, read a joint paper before the British Medical Association on the "Bacteriology of Tooth Brushes." It appeared to them that even in an infected cavity such as the mouth it was preferable that an instrument which is so used that it may scarify the gums should not convey any additional organisms into the wound. The tooth brush, therefore, may be the origin of pyorrhea alveolaris, which may lead to such grave consequences as anæmia, gastritis and arthritis. They advocate the use of a new tooth brush each day, or that all tooth brushes should be boiled for five minutes before and after use. The writer, after having read this article, and deciding that these plans were impracticable, invented the "Tooth Brush Sterilizer" (a description of which can be found in May, 1913, ITEMS OF INTEREST). Dr. Wm. Litterer, bacteriologist of Vanderbilt University and State of Tennessee, made experiments with this sterilizer with the following results:

Test of
Tooth Brush
Sterilizer.

"Experiments were made with full strength of formalin (Formaldehyde gas 40 per cent. in water). I used the following bacteria to test the germicidal power:

- (1) Streptococcus pyogenes
- (2) Staphylococcus pyogenes aureus
- (3) Bacillus typhosus
- (4) Pneumococcus

"The following method was employed, viz: The tooth brush was rendered sterile by superheated steam (autoclave). The sterile brush was dipped into a pure culture of (1) streptococcus pyogenes, and was then returned to the receptacle to be acted upon by the formaldehyde gas. All of the above germs were treated in like manner, and in every



instance double controls used. Both positive and negative controls. The result was that complete sterilization was effective in less than an hour's time. By drying the brush with the bacteria adhering to it the effectiveness of the sterilization was greatly impaired. The above results were obtained by using only the full strength formalin. No dilutions were

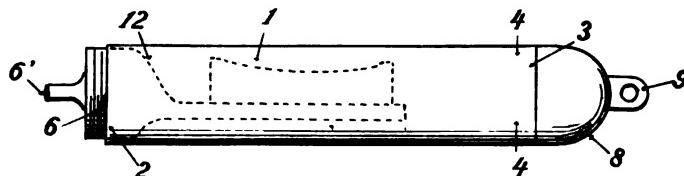


Fig. 1.

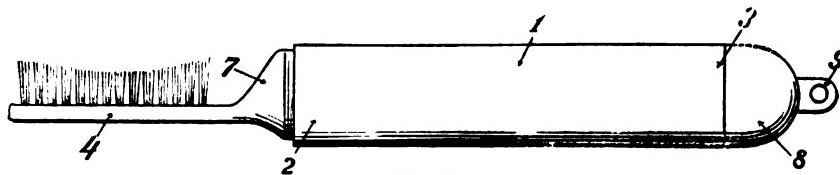


Fig. 2.

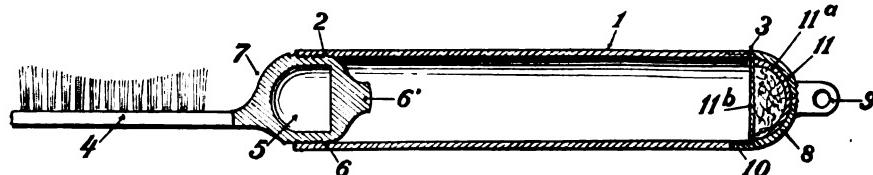


Fig. 3.

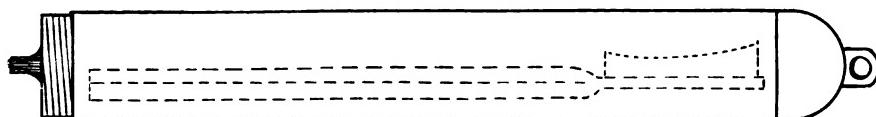


Fig. 4.

used. The question as to whether it would be too irritating to the gums can be answered in the negative if the brush is rinsed in water before using. The method appears to be a very effective and unique way of sterilizing a tooth brush, and in my opinion should be seriously considered by the dental profession."

The writer originally designed a tooth brush and sterilizer combined, as shown in Figs. 1, 2 and 3. Fig. 4 shows a sterilizer to be used for any brush.

The writer is indebted to Dr. Ottolengui for making the sterilizer practical. Improvements have been made on the original idea. It con-



sists of a long cylinder of glass or celluloid, like a test tube, in which an ordinary tooth brush can be kept, closed by a hemispherical cap, which contains a cotton roll saturated with full strength of formalin, the vapor from which renders the inside of the cylinder as well as the brush bristles sterile. The sterilizer also allows for the drying of the bristles. Dr. Jones and Dr. Smale, of London, experimented with this new idea and report that it efficiently sterilizes. Recently further experiments have been carried out along this line in London. The Star Company, of Great Britain, has the following article, which was extensively copied in this country, "To Keep Your Tooth Brush from Making You Ill":

"Recent experiments show that the great majority of tooth brushes are in a disgusting state of uncleanliness and so laden with germs that they are capable of spreading all sorts of disease. A brief ablution under the tap or in a tumbler after using is all the cleansing the average tooth brush ever receives, and this is totally inadequate to render it reasonably clean. In these experiments each of twelve sterile brushes was used once, rinsed ten times in a tumbler of water, and after standing twelve hours all the bristles were removed with sterile forceps and examined for germs. In eight out of the twelve cases more than a million organisms were found, a number comparable with that found in sewage. The brushes examined had been used by persons suffering from diseases of the teeth and gums. But four brushes used by persons with apparently healthy mouths revealed almost as large a number of bacteria. Antiseptic powders and pastes are helpful in keeping brushes clean, but even they are not sufficient. Experiments with seven such preparations showed that there was an appreciable reduction in the number of organisms; with two others there was practically no change; while with three others there was no appreciable improvement.

"What makes the tooth brush particularly dangerous is that each bristle point acts as an inoculating needle in carrying the microbes into the delicate membranes of the gums. As the tooth brush should be used at least twice a day, the gums get no chance to throw off one infection before another is forced upon them. Dr. Ernest C. Dye, of Greenville, S. C., has invented a tooth brush with a hollow handle to meet these difficulties. As soon as the brush has been used the bristle end is unscrewed and stuck into the hollow handle. In the inside of the handle a few drops of formaldehyde or some other powerful disinfectant are kept. The fumes of the disinfectant sterilize the brush before the next use. The same results may be obtained by keeping the ordinary tooth brush in a wide-necked bottle or fruit jar or any receptacle which can hold the brush and a few drops of sterilizer. It must be air tight."

The inventor has used a brush sterilized as described for practically

three years without any injury to the teeth or soft tissues. There is no unpleasant sensation from the use of the brush after being enveloped in the formaldehyde gas. One should either hold the brush under the tap or rinse in a glass of water before using.

The sterilizer is inexpensive and easily manipulated. All tooth brushes should be sterilized, for a healthy mouth, as has been shown, contains about as many organisms as an unhealthy one. It is especially helpful to the specialist in his efforts against the ravages of Riggs' disease.





Second District Dental Society, January Meeting.

A regular meeting of the Second District Dental Society of the State of New York was held on Monday evening, January 11, 1915, at the Kings County Medical Library Building, No. 1313 Bedford Avenue, Brooklyn, N. Y.

The President, Dr. A. H. Stevenson, occupied the chair, and called the meeting to order.

The Secretary read the minutes of the last meeting, which were approved.

This meeting to-night is a rather remarkable **President Stevenson.** and unusual "gathering of the clans." In this room now there are assembled representatives from at least fourteen institutions in this borough, including orphan asylums, settlement houses and reform schools. All have come at the invitation of the Second District Dental Society for a definite single purpose—to learn how best can be accomplished the correction of that most serious handicap to child development—the unwholesome and diseased mouth. The great proportion of children in our institutions struggling to acquire their mental, moral and physical development under this handicap has aroused the administrators of these asylums to action. Something must be done, and done promptly, they agree; and just how to proceed with corrective measures has been the topic of discussion at innumerable trustees' and directors' meetings of late. This society has received many requests for advice during the past year, and as the official organization of the dental profession in this community we have been glad indeed to render any assistance within our power.



To be of further usefulness, we have convened this meeting, with the firm belief that you were entitled to even better advice than we could give; in fact, that the best was none too good. We have invited those to speak to you whose words are expert, and whose ideas are practical, being the result of profitable experience.

Before introducing them, I wish first to impress upon your minds that the topic of the evening is prophylaxis and prevention. From the health line of the normal, there is the deviating side or the minus side of disease; and then on the other hand, the plus side of prevention. In trying to make our equation, we will take under advisement this latter phase of prevention—all other considerations being subservient.

The first speaker is a man whose love for children has inspired him to devote energies and considerable means in this direction for a period covering many years. He enthuses all who hear him, and I take great pleasure in introducing to you Dr. A. C. Fones, of Bridgeport.

Dr. Fones then read the paper of the evening, which was entitled: "The Dental Hygienist in Public Institutions."

The paper was illustrated by lantern slides. The paper was published in the February issue.

The great problem lies in those 1,575 cavities in the permanent teeth, found in children in the first grade, and therefore existing before the child starts school life. I am convinced the parents of those children will have the cavities filled themselves, because the moment they find out the condition, they ask, "What shall we do?" We hope finally to educate the parents to take care of the children's teeth from two and a half years to five years, up to when the children come to school.

Dr. Fish. Do you mean there were 3,826 children, and in that number there were 1,575 cavities in the permanent teeth?

Dr. Jones. Yes. In the second grade we found 742 cavities in 840 children. The whole problem rests here—the extraction of so many of the temporary teeth that are reeking with filth, and very many with abscesses, and they should be taken out; but we can cope with that condition, because those permanent teeth are coming through, and as they do, with proper prophylactic treatment and education in regard to cleanliness, I believe we can prevent decay. In fact, I know it is feasible to prevent all but very few cavities from forming.

Dr. Ottolengui. Do you believe if each school would have one dentist he could take care of those cavities in the temporary teeth?

No, it is impossible. How can we handle such a

Dr. Fones. proposition? We cannot handle it from the stand-point of actual operative work, but we can handle it from the prophylactic standpoint. We must learn to wait, and that is the only way any educational problem has ever reached success. The man who thinks everything can be done in three or four months is mistaken. The public soaks up those things slowly. You must be willing to wait and slowly give that knowledge and keep on giving it until at the end of five years you will not see any figures such as these. I am as confident of it as I am that I am alive.

We have listened to a gentleman who has a

President Stevenson. beautiful ideal, and who has not hesitated to try to bring it to its fulfillment. There are undoubtedly some in the profession who do not just agree with the methods and means that he has used; but after all, it is the result that counts, for "by the fruits shall ye know them." I hope this society will again have Dr. Fones here, not many years hence, when he shall have compiled further data that will be so overwhelmingly convincing that there will be no doubting Thomases whatever.

Dr. Fones has not spoken directly of asylums and such institutions, but there are many here who are particularly interested in such organizations. We are going to deviate from the usual way we conduct our meetings, and instead of throwing the paper open for discussion, we are going to have another paper by a gentleman who comes from Boston, and who has been doing perfectly wonderful work there in an orphanage known as St. Vincent's Orphan Asylum. By means of strict application to hygiene, and rectifying dental lesions, he has almost eliminated dental decay.

I will introduce to you Dr. S. E. Keyes, of Boston.

Dr. Keyes. Before I begin, let me say that I am an avowed opponent of the dental nurse problem.

Dr. Keyes read his paper.

Discussion of Dr. Fones's Paper.

President Stevenson. I received a telephone message from Dr. Baker, of the Department of Health, telling me she could not attend, as she had left her office this afternoon feeling very ill; but there is in this room the chief medical inspector of the department of Child Hygiene. He is vitally interested in this work and I will call on Dr. R. H. Willis.

Dr. Willis. The subject is one in which we have been interested for many years. We have arrived at the conclusion that the problem is such a tremendous one,



that it is almost impossible to do anything until someone can convince the Board of Estimate of the immensity and importance of it.

There is so little than can be done that it is practically a hopeless problem until more money can be obtained. The results have been very gratifying as far as we have gone; but it is merely a drop in the bucket.

I think Dr. Fones has very clearly shown you

Dr. C. P. Hyatt. what will be the effect upon the human being if dental neglect is started in early life—the imperfect development of the skull, and the effects on the brain. It does not seem to be there can be any question as to the importance of doing the work; but it is so gigantic that we hesitate! And we hesitate! And still we hesitate.

We remember very well that when the United States government sent some officers down to the Panama Canal, many of the men feared it would be run on a military basis. The Colonel said: "The only military part of it will be that I am the boss, and you are my lieutenants, and there is the gap. We must get at the enemy."

Now, in regard to this, we should not say one plan is better than another plan, and wait and do nothing.

I do not find fault with Dr. Keyes when he does not believe in the dental hygienist, nor do I find fault with Dr. Fones when he does believe in the hygienist; but let them get at the work and we will support both of them.

If you want an institution to have hygienists, for the Lord's sake go at it and let them have it. If you want an institution with men to do the work, then for God's sake go ahead and get at it. Do something.

You talk about the money. I spoke with a gentleman only yesterday about the terrific condition of the subway. He said: "Dr. Hyatt, there was just one man who had gumption enough to say what was needed, and he emphasized the fact that he would only be in favor of a subway in New York with eight tracks. They only wanted two—an uptown and a downtown. He compromised on six, and the short-sighted politicians cut him down to four. It is costing hundreds of millions of dollars, because they could not see the broad ideas of the man who wanted these eight tracks instead of two at the beginning.

If we could only show the heads of the city that we are going to save them millions of dollars—I am sure we will save them a hundred million dollars—I am sure they would help us. How much does it cost this city to educate the pupils who are not promoted at their proper time?

Forty-six dollars a year for each pupil. About

Dr. Ottolengui. 85,000 are not promoted annually.

That is only New York. Then there are all the other cities. Count all the others and see what it amounts to. I believe that of all the criminals we have to pay big police forces for—the insane asylums, the hospitals, and all the big institutions, there is a large percentage that would have been saved to the human race had they had a proper development of child life. How many criminals are there? How much thievery? How large a police force? How many convicts?

I think I was modest when I said a hundred million dollars; I should have said a hundred thousand million dollars. Add to that the loss of work and the benefit we would have had from intelligent men and women, and I think you will quadruple my figures instead of making them smaller. We become fascinated with the possibility of what will come to the human face when we wake up and spend a few million dollars to take care of the children in our cities.

One of the directors of the St. John's Boys'

Dr. Shea. Home in Brooklyn was to be here this evening. I invited him, and also a director of St. Joseph's Female Asylum. In those institutions we have no dental hygienist, but I wish they had. They have, however, done the best they could. They have from 1,100 to 1,300 boys at St. John's School, and about 800 girls in St. Joseph's. Those children come in as infants, from two or three years old upwards.

I became interested in that work, and obtained my knowledge from the committee in this society. I followed up their suggestions, and I realized after starting the work in those institutions how absolutely impossible it is for any man working ten hours a day to do anything of any amount.

I mentioned this fact several years ago. Before I went to these institutions they had had dental treatment for the past twelve or fourteen years. The man who was there had done a great deal of work along the line of filling and treating teeth, and had devoted a great deal of time to abscessed conditions and putrescent root canals. He did not get any great amount of figures to show; but when he was finished, he had cleared up a lot of work, and had done it properly. I do not think the directors of the institution realize how much work he did. He worked on the theory that he would do the work for that institution as he would do in his own office, and I believe any man should do that, or the institution is no place for his work. It takes time to do it, and it will take a competent, conscientious man a long time to clear up the teeth of 800 children.

They gave me an assistant and a nurse and I trained the nurse along



Society Discussions

the lines Dr. Fones has described. This was a graduate nurse, and she had someone to help her. My assistant goes into those institutions and takes care of the teeth of the very youngest children. When a child is brought in, it is sent into the quarantine house and isolated for a time to see that nothing develops. A medical examination is made, and it is then turned over to myself or my assistant, usually myself, to make a thorough examination of the mouth. We look for diseased conditions. Nearly every case has to have dental treatment, even those children two years old. It is sent over to the dental infirmary. My assistant takes care of that child or children. Usually three or four come in at a time. I do the educational end of it by going through the class rooms lecturing to the different classes. We have a regular course, and they pass a regular examination, and they know the physiology and the circulation. I want them to understand why. The children in the higher grades will surprise many of you, if you go in there and ask them questions.

It is a Roman Catholic organization. They do not ask me to do the work for nothing, and I consider that I am well paid, and so is my assistant. All we have to do is to ask for what we want. They manage to get the money, and they give us everything within reason. I am hoping we will get three or four good men there, so we can give more time to the work.

We are starting with the younger children, and making sure of every child that comes in—the lower grades are all cared for, and we do the best we can with the other grades. As Charles Mayo says, the science of medicine to-day is in prevention. The *ITEMS OF INTEREST*, for August I would like to have you read on page 611, an article by Joseph Kussy.

President Stevenson. Mr. Grinley, who is in charge of one of the institutions Dr. Shea mentioned, is with us, and we would be glad to hear from him.

Mr. Grinley. I do not know that I can supplement anything that Dr. Shea has said, beyond the fact that I was instrumental in having him come to us. I cannot speak from the professional side—only the business side. I found the results the last year or two very good—in fact, I was disappointed that we could not have Dr. Shea's services entirely.

I was interested in his method of arousing the children's interest by means of pictures. He threw a picture of Christy Mathewson on the screen first, with a nice smile on his face. He asked the boys if they wanted to be as good a ball player, and, of course, they all said yes. The next day they used up all the soap in the place. They cleaned their teeth a dozen or two dozen times a day.

In the girls' school, he showed a picture of Mme. Melba, and she had a nice smile. Of course, all the girls wanted to be like her. The children all became interested, and his training and the quiz convinced me that the boys understand the rudiments anyhow of keeping the mouth clean, and I agree entirely with what Dr. Shea has done. I think it would be a good thing if preventive methods could be inaugurated in other institutions.

It is impossible for him to keep the teeth of every child clean, but the members of the board all agree that an ounce of prevention is worth a pound of cure. I am glad to say a work of commendation in regard to these methods.

I might mention that whenever we do extraction in the homes, if there is one parent alive, we always get the consent unless it is an emergency. In most cases we get the parents to sign a consent to the extraction.

I notice in the lecture by Dr. Fones that the hygienists are carrying their dental office around with them. It seems to me the time must come when the State will at least supply that. There is an equipment in a school in this city which was obtained through the influence of the Kings County Society. Dr. Williams and Dr. Shapiro can tell us something about it, and I think it would be an interesting contribution to this discussion.

For several months we have almost let it go out of sight. During the school season of 1913-1914, the work went on by voluntary service. The members of the Kings County Dental Society, to the extent of ten men, worked at the rate of two every day, and managed to fill out the week, each man devoting one and a half hours of his time in the morning, making three hours a day for five days a week. The equipment was furnished by having collected some money in the neighborhood from certain charitably inclined people.

It is very hard to conduct a clinic by voluntary work on the part of men. Men promise sometimes to come and do work, and fail to appear, and the principal became somewhat tired of it. Some men are faithful and persevering in it, however.

This society conducted a clinic some years ago under the auspices of the Bureau of Charities of this city, and we found in dental work of that kind, where a man continues an operation commenced by someone else, it was not always a success.



For the first six or seven months we went at the

Dr. Shapiro. work in the old manner of treating carious teeth,

and continued to do that until Dr. Hyatt, I believe, made the suggestion that instead of continuing to do the work in that way, we restrict our work to the prophylactic end of it, and confine our work chiefly to the children in the lower grades, which we did.

I called for that record because this informa-

Dr. Ottolenghi. tion will be read all over the country. There has

been a clinic conducted here in this city in a room in a school. It has been changed, I understand, to a prophylactic clinic.

You all laughed when Dr. Hyatt said it was possible by prophylaxis to save in the United States a hundred million dollars. I was surprised personally that Dr. Hyatt put the figures so low (laughter). He did not say in what period of time that would be saved, but if we gave him time, I think probably he would have told us.

I will show you how quickly this runs into real millions. I had the honor of being present at the dedication exercises of the Forsyth Dental Infirmary, in Boston, and one of the speakers, Mr. McSweney, who is the head of the hospital for consumptives, made the statement that there are 128,000 defective children in the public schools in Boston, and if some effective means of preventing tuberculosis were not found, that before these children reached the age of twenty-five, 12,000 of them will have died of tuberculosis, and the State will have spent \$3,000,000 on the useless education of those children who die before they return anything to the State, either through production or property, or through the production of children.

Since hearing that statement, it has seemed to me that if the State could lose \$3,000,000 by the death of the children from one disease only, if we could get the complete statistics we would find we are uselessly spending money on the education of children who are doomed to death before they can repay the State to such an extent that Dr. Hyatt's estimate is ridiculously low.

I just met a gentleman who said if he had known

Dr. Hyatt. I was going to speak along the lines I did, he would

have supplied the information as to what it cost the city alone—\$3,000,000 a year for pupils who do not progress in the ordinary way.

Dr. Evans, of Chicago, told us that ninety-five per cent. of the children who were not promoted had physical defects, and ninety-nine per cent. of those had defects of the mouth.

We have asked some of these gentlemen about the importance of cleaning teeth. Why swat the fly when it is a great deal better to remove the breed-

Dr. Van Loan.

ing places. It has been my experience, where children can be induced to eat hard or crusty bread, that we do not have the cavities in the teeth, and the dirty teeth that we get where the children are brought up to cut out the inside of the bread and eat it. I have seen that proven in many instances. I was called in by a doctor to see why his seventeen months old baby did not cut its teeth. I said: "How much bread does the child eat." He said: "None." In one jaw it only had one central incisor and one lateral, and in the other jaw the gums were swollen and had to be lanced to help the teeth through.

Shortly after that another patient came to the office with a baby. She said: "Doctor, the child has fever, and the physician has suggested that the child's teeth bother her."

The child was seventeen months old, and was about in the same condition as the other child I spoke of. I lanced the gums over the teeth, and the relief was immediate. The mother said: "Why does not the child cut its teeth in the proper manner?" I said: "How much hard bread does the child get? Was it brought up on patent food?" Her answer was "Yes." Most of the children you heard spoken of to-night are the children of the foreign element. The mothers and fathers were brought up on hard crusty bread. When they come to this country the child goes early to the candy shop, and does not get food that requires the force and mastication such as Dr. Fones so ably exhibited in his pictures of the muscles of the jaw.

We must keep the teeth clean—we all admit that; but I do not believe that is all. I believe you must use those teeth, and the child must be taught to use them as soon as they erupt almost. In my own family, I have three children, two of them quite well grown. The father and mother have very poor teeth. Those children have been brought up under the conditions I have laid down here, of beginning when the child is five or six months old, to munch a crust of hard bread. One child at nine years has all the second teeth with not a particle of decay, and without extensive prophylaxis. The second child is six years of age, and beginning to get the second teeth. She never had her teeth cleaned by a dentist, and never had a cavity in any of the teeth.

Dr. Jones. I do not wish to be misunderstood in the presentation of this paper that I am not in favor of a repair clinic. We must have a repair clinic, but the prophylactic work should be much larger in scope, to prevent the decay.

The last gentleman who has spoken is absolutely correct in his statement; but before we can get to that point, we must start at the first round of the ladder. We must interest the children in the prevention of decay, and then educate them to use those teeth as they should and chew hard

food, and instruct them in the proper brushing of the gums and the development of the teeth.

You must start at the lowest rung of the ladder and interest the children, and have them carry the message home; and then you can do more educational work. Compulsory fillings in the schools is wrong. When you say "You must have your tooth filled," the parent says "Who says so? The child says "I don't want it done, it will hurt." You must say it is a menace to the health of the other children in the room.

The State should look to it, but it will be some time before you can make it compulsory that the child should be led to a room where it shall be done. However, you can interest a child, where you cannot compel him. We must teach people how to feed their bodies. It will all come in time, but very slowly. There is an inertia in that respect, and you can only deflect communities a very little at a time. The larger the mass of people, the harder it is to influence them. With children in the lower grades, six, seven or eight years old, what is taught them in school is law. They will follow it out at home. It must be based on absolute fact to have scientific interest. I have children ten, twelve or fourteen years old in my practice, who have never had a cavity. I have had adults under observation who have not had a cavity for years. It is not a theory with me; it is an actual experience. Any man in the room can do it. You put patients through a course of prophylaxis, and if they will be faithful, you can absolutely eradicate decay.

Much of the disease among children is absolutely unnecessary—I mean to the extent that it is found in the public schools. See what Dr. Keyes has done in four years. In 1913, I investigated one hundred and sixty cases in my practice, and only eight out of those had been sick in that year. There is something in this, besides the question of the teeth. The teeth are only a small part. It is the entire body. The mouth is the greatest incubator, and the hands are the greatest carriers. When you teach children to eat nothing until their hands are clean, and you help them to keep their mouth and teeth clean, you will practically wipe out all infectious diseases, and seven-eighths of the misery that is now going on.

President Stevenson tendered the thanks of the society to the essayist, and to the gentlemen who participated in the discussion.

Adjournment.



Dental Prophylaxis.

We present in this issue a symposium on dental prophylaxis, with special relation to the home work to be done by the patient himself. The word "prophylaxis" presupposes a state of health, or at least an absence of any extensive area of disease. True prophylaxis then entails the prevention of the occurrence of disease, though the term may be made to include the prevention of the spread of disease from a small to a larger area. In either case the cure of existing disease must be within the province of the dental attendant and should not be relegated to the patient. To the patient, however, may, indeed must be entrusted the constant cleansings which will aid the dentist in his curative work by preventing reinfection of healing surfaces, and which will prevent the infection of healthy tissues, in which last respect the patient co-operates in a genuine prophylactic campaign.

It is manifest, therefore, that no instructions should be given to a patient which might render it possible for him to induce infection of any of the oral tissues. This brings us to a discussion of the most vital point of difference between the contributors to the symposium.

Rotary Brushing.

Dr. M. L. Rhein tells us that the rotary motion of the tooth brush is to be avoided; that clinically and theoretically it is dangerous; that the points of the bristles should not touch the gum tissues for fear

of puncturing; that with skill this method may be used in mouths of individuals enjoying immunity, but that where immunity is lacking the danger of infection is sufficient to render the method dangerous. He adds that he thinks the method has been adopted because it has proven successful in the mouths of children, and then claims that children have a well-established zone of immunity.

There seems, however, to be two views on this subject. Dr. Grace Rogers Spalding makes one of the wisest and most important contributions to the symposium where she says: ". . . our greatest ambition and desire is to produce and maintain clean, healthy and comfortable mouths, containing an efficient masticatory apparatus. We value much more the sustaining and supporting structures of the teeth than we do the crowns of the teeth." It seems highly improbable that a practitioner could thus express the importance of maintaining the health of the environment of the teeth and yet teach a method of cleansing which clinically had resulted in producing infections, even occasionally. Yet later Dr. Spalding says: "I prefer the circular motion of brushing."

"Dr. John Oppie M'Call says: "The brush is moved on the tooth surfaces as though describing circles with the bristles." He does not definitely state that the bristles must brush the gums as well as the teeth, but it would seem difficult to avoid touching the gums with any sort of circular movement.

Dr. Andrew J. McDonagh tells us that, "On some of your teeth, just at the gingival margin, it is necessary for you to use a circular motion to reach every part."

Dr. F. H. Skinner agrees with Dr. Rhein. He says: "Brushes are to be used always with a rolling motion, placed well up on the gums and brought toward the incisal ends of the teeth, and the bristles should never be allowed to stab the gums." . . . "He should be careful never to prick the gums with the bristles, as they always carry infection."

Dr. Paul Stillman says that the brush "should always be used with . . . the free ends of the bristles always at right angles to the surface to be cleansed, using reasonable pressure and a very short circular stroke. Scrub the crown and gums of each tooth, one tooth at a time."

It is perhaps Dr. Alfred C. Fones who has been the most ardent advocate of the circular or rotary motion in brushing the teeth. His

article in this issue is really a reproduction of an illustrated pamphlet which Dr. Fones gives to his patients. There is no doubt that Dr. Fones means the rotary motion to reach the gums as well as the teeth. He not only tells us so in plain words, but he pictures the movement so that there can be no mistaking his intentions.

Dr. Fones, more than any man in dentistry, is the apostle who preaches the prophylactic advantages to be gained by the constant and proper brushing of the teeth. To prove his contention he has sacrificed much time and money in inaugurating a school for the training of dental hygienists. These women have been taught to teach the rotary method of brushing. During the past winter ten of Fones's hygienists, under his supervision, have taught some four thousand children to brush the teeth in this manner. This experiment in school prophylaxis has been so successful that the municipal authorities of Bridgeport have granted him the appropriations needed to treble the operations for next year.

It is perhaps this fact which Dr. Rhein has in mind when he tells us that it is success in the mouths of children who enjoy a high immunity which has given the rotary method any standing. To this argument two responses may be made and must be considered.

Theoretically children enjoy greater vital resistance to 'inroads of disease than do adults. On the other hand, child mortality is much higher than that of the adult, per capita of the population. The adult is the child who has had sufficient vital resistance to escape mortal diseases and has thus arrived at puberty. It follows then that when dealing with large numbers of children there should be some as easily infected as any adult; some as lacking in immunity. If then there is danger of infection from the rotary motion of the brush, such infections should have occurred in some of the mouths of the four thousand children who have been taught by the Fones hygienists to practice this method daily. If such infections have occurred, as may be argued, then either the medical inspectors in the schools or the hygienists themselves have been derelict in an important duty. Indeed, as this winter's work has been purely of an experimental character, it should have been most closely watched by the medical inspectors to make sure that no harm came to the children.

The other thought is this. It is true that at present Dr. Fones and



Editorial

his aids are promulgating his doctrines more among children than among adults. But it is not true that Dr. Fones in his private practice has been specializing with children. On the contrary, his records show that the major part of his practice has been upon adults, and no inconsiderable proportion of it has dealt with mouths which came to him in an infected condition, and which have been made healthy and maintained in a healthy condition by this rotary method of cleansing.

Yet, on the other hand, Dr. Rhein has given too many years of study to the subject of mouth hygiene, and in latter years more especially to the question of infections emanating from within the oral cavity, for us to lightly dismiss any warning that he may give.

How, then, may we compose the radical differences between these two extreme views. On the one side we hear: "Avoid the rotary motion of the tooth brush lest you infect the soft tissues!" Conversely we are told: "Use the tooth brush upon the gums in rotary movements and bring the soft tissues to a state of health."

A Possible Solution of the Problem.

The writer disavows any special knowledge of prophylaxis; still less is he qualified to determine problems involving questions of immunity to infection. He is, however, cognizant of certain fundamental principles from which it seems to him logically possible to arrive at the truth in regard to this danger of infection from a tooth brush used in rotary fashion.

If ten dentists, aye, even ten periodontists, be seated in a room, and if sterile swabs be brushed along the gums, and then swept lightly across the surfaces of Petrie dishes filled with agar-agar, and these be then incubated, within a few days in all probability growths of fungi and bacterial forms of various kinds will be discovered in every dish. Among the bacteria will be found many which we associate with serious pus conditions. Why then do we not find actual pus foci in these mouths?

The explanation depends upon the question of pabulum and immunity. These bacteria, containing great potential virility, are nevertheless innocuous, simply because conditions and vital resistance prevents their propagation.

Lower the patient's vitality, even though the patient be a child, and



coincidentally abrade, scarify or otherwise break down the protecting epithelial layer of the mucosa and within twenty-four hours a focus of pus may be present. The writer has seen serious, really serious interproximal infections, from a fish bone forced into the gums; from a loosened orthodontic band which because of its looseness has been forced against the gum; from particles of food jammed between the teeth and there held by rough fillings or by cavities, etc., etc.

It is therefore perfectly possible, as Drs. Rhein and Skinner claim, that an infection may result from the use of a tooth brush in such manner that the bristles pierce the gum.

Why, then, do we not hear of these infections in the mouths of the patients of Drs. Spalding, M'Call, McDonagh, Stillman and Fones?

These men do not recommend that the teeth should be brushed with the rotary motion *just once!* If four thousand school children should use the rotary motion of the brush just one time, and then abandon the method, it is highly probable that a great many, hundreds probably, would exhibit inflamed or infected mouths within forty-eight hours. But the Fones hygienic school propaganda cannot be adjudged in this manner. The child cannot brush his teeth, wound his gums and leave the abraded tissue to be preyed upon by the mouth bacteria present. The brushing is followed by the use of lime water so prepared and so used that, we are told, that it will dissolve and remove bacterial placques from the teeth, while the brushing and consequent massaging of the gums produces an influx of blood, exciting a greater activity of the white blood corpuscles, and hence an increased phagocytic action. Thus the numbers of the invading parasites are decreased partly by friction of the brush and partly by solution and washing away with lime water. Coincidently the vital resistance of the host is increased through freeing the mucosa of infected mucous and slimed-up, dead epithelial cells, while an improved blood flow invigorates the parts and consequently immunizes the tissues to some extent.

The battle, moreover, is not limited to a single skirmish. The patient inauguates the treatment before breakfast and repeats it after meals, so that the combat is continuous. Even if at first there should be some slight wounding of the tissues, the complete treatment, so Dr. Fones tells us, not only does not result in infections, but in the end produces



mouth tissues which practically cannot be injured by the most vigorous brushing, and which are in a high degree immune to infection from any of the mouth flora.

May it not be that a single use of the rotary method might cause infection, whereas the continued and constant use might induce immunity? These views are only advanced tentatively as possibly accounting for the antagonistic opinions held by men of admitted exxperience, and further discussion is invited.

In the symposium there are other contradictory bits of advice, which, however, need not be considered here. Some succeed with small brushes, while some prefer larger. Some recommend dentifrices, while others do not. There seems to be one factor common to all directions, which perhaps is more responsible for good results than either large or small brushes, with or without dentifrices. And that factor is a vigorous wrist movement, with a plentiful supply of what grandmother used to call "elbow grease."





IF THERE IS ANY ONE who thinks that there is not a good hotel in the

- ◆ Borough of Brooklyn, let him visit the Hotel Bossert. And if there is
- ◆ any one who thinks that they do not have good dental meetings in Brook-
- ◆ lyn, he missed it by being absent from the April meeting of the Second
- ◆ District Dental Society, which started with a sit down, around the table
- ◆ dinner, and ended with an all around rattling good series of talks about
- ◆ filling root canals and what happens if you do not fill them. But that will
- ◆ all come out later. Just at present let me tell you about the talk down in
- ◆ the Grill, after the scientific crowd had departed. I almost called them
- ◆ the Scientificos.



THEY DID NOT KNOW IT but I purposely invited only those who know

- ◆ (or think they know) how to make scientific bridgework. As they say
- ◆ about Postum, "there was a reason." There was one funny incident during
- ◆ the discussion. When the President introduced Dr. Schamberg to take
- ◆ part in the discussion he remarked; "There is a gentleman here from
- ◆ Manhattan. He does not know that I am going to call on him but I do
- ◆ so because I know he has something to say that will interest us all."
- ◆ Then Dr. Schamberg went at the subject hammer and tongs, and to
- ◆ clinch his argument showed a few lantern slides. Not so bad, con-
- ◆ sidering he did not know he was to speak. Nothing like carrying your
- ◆ slides always in your vest pocket. Never know when you may need,
- ◆ them these days.



FACT IS, DR. SCHAMBERG knew he was to be called, only the President did

- ◆ not know that he knew. It was like this. I was talking to Dr. Scham-
- ◆ berg over the telephone during the morning trying to get a report about
- ◆ a patient, when he burst forth with a perfect tirade against bridgework,
- ◆ and the deaths and disease that could be traced to rotten bridgework
- ◆ put on rotten teeth. I think that was the way he put it, and he was not
- ◆ making any joke either. Perhaps he used a little more polite language
- ◆ than that, but his meaning was not the least little bit more polite.
- ◆ Finally I remembered my patient patiently waiting, and broke in with

❖ "Oh! Tell it to George." "What is that?" said Dr. Schamberg, "I did not get that!" "I say come over to-night to the Second District meeting," said I, "and I will ask the President to let you tell us all about it publicly. And bring some pictures to back up your story."



THAT WAS HOW it happened that Dr. Schamberg was ready with his

❖ argument and his pictures when called on. And believe me it was
❖ dramatic! Remembering how the bridgeworkers of the country roared
❖ when Dr. Hunter dropped a few remarks about "American Dentistry,"
❖ and "Septic Dentistry," sort of linking the two together as it were, I
❖ could not but wonder to see that large audience applaud Dr. Schamberg
❖ when he announced that "the bridgework of to-day, with its dire results
❖ in maintaining oral sepsis is such a crime, that if the dental profession
❖ does not itself solve the problem of supplying artificial teeth without
❖ utilizing incurably infected roots as abutments some day the Govern-
❖ ment (Government with a big "G") will take the matter in hand!!! Or
❖ words to that effect.



"FAR BETTER WOULD IT BE," said Dr. Schamberg, "to extract all dead

❖ or pulpless teeth and insert old-fashioned teeth on plates, than to
❖ continue the disgraceful methods of bridgework attached to septic teeth
❖ hundreds of which are not cured first, and still other hundreds of which
❖ are not curable at all, with the result that the hospitals are filled with
❖ patients suffering from all manner of body ills, traceable to the infected
❖ teeth under the bridgework, which constantly seep dangerous toxins into
❖ the system."



LATER HE ADMITTED that a few men are constructing "safe-to-wear"
❖ bridgework. But he did not mention the gentlemen's names.



THEREFORE I INVITED a few bridgeworkers down into the Grill that I

❖ might discover just how they had liked the grilling from Dr. Schamberg.
❖ Addressing Bridgeworker No. 1, who is a No. 1 bridgeworker, I asked
❖ "What do you think of the picture painted by Dr. Schamberg. Was it
❖ too highly colored?"



"NOT AT ALL," replied Bridgeworker No. 1. "As he says, it would be far

❖ better for the public at large if they could be taught that plates would
❖ be better for them. True, a clasp around a living tooth may eventually
❖ cause decay, but even so, if the patient is cleanly and the clasps are
❖ properly made, there need be no injury. And even when there is, a
❖ filling in the tooth is less serious than the septicemias caused by bridge-
❖ work done by men, many of whom cannot properly treat and fill a root
❖ canal, and many others of whom never even try to fill them, as the radio-
❖ graphers are constantly pointing out. Honestly, men, it makes me
❖ ashamed to call myself a bridgeworker when, as was the case to-night,
❖ picture after picture is shown on the screen, not one abutment root
❖ showing a proper canal filling, and eighty per cent. of them decorated
❖ with abscesses. As Dr. Schamberg said, it is a crime. Worse than that,
❖ it is a scandal."



Items of Interest

"WHY IS A SCANDAL worse than a crime?"



"WHEN AN ACT is recognized as a crime, the criminal may be punished, but

- ❖ those that make scandals live on to ply their trade. It is several years
- ❖ since Hunter pointed out this disgrace. What has the profession as a
- ❖ whole done about it? A few men, a very few men, have taken Hunter's
- ❖ charge seriously, and if a better day does dawn for bridgework, it will
- ❖ be through the activities of these few."



"YOURSELF BEING one of the few?"



"I DO NOT SAY so, but I hope so. It certainly has been my endeavor to

- ❖ produce a style of bridgework that will serve and not endanger the
- ❖ patient. Whether I succeed or not let my critics say after my death.
- ❖ The subject is too serious for jest, even around the table."



"NO ONE MEANS to make a jest of this. But tell us if you can, where lies

- ❖ the solution."



"AS I SEE IT the first requisite should be that all bridgework should be removable. First because by this means it may be cleansed and thus will be more hygienic. But the main reason is this: When bridgework is firmly cemented to two, three, four or more abutments, one of these abutments may be, or may become so diseased as to be a menace to the health of the patient, and he may never come to know it because the cementation of the bridge to the other abutments hides from him the fact that this particular root has so little live attachment to its socket that it should be extracted. But if only removable bridges are used, the patient can quickly learn if one pier become so loose that it should be extracted. Not alone will it become loose, but with the frequent removals of the piece it will usually become painful. Pain is a very good thing for a patient occasionally."



"LET ME AGREE WITH YOU," said Bridgeworker No. 2, who is a pyorrhea specialist; excuse me, a periodontist—"and then let me make another point. We all recognize that fractured bones knit more rapidly if held immovable in a splint. Similarly, teeth loosened by pyorrhea can often be absolutely cured and made tight again if splinted together. But something more is needed than fixation. All diseased tissue must be removed, and all infection must be cleared up. But because teeth that have been splinted have been cured of pyorrhea, too many of you bridgeworkers, who seem to have little or no knowledge of pathology, seem to think that any two teeth tied or splinted together are at once put on the high road to recovery."



"BUT WORSE THAN THAT, because fixation is one factor in the cure of pyorrhea teeth under certain conditions, some of the bridgework specialists, or perhaps it would be more fair to say some of the general practitioners who do bridgework (note that I say "do" bridgework, not practice it); some of these men jump to the conclusion that a loose tooth



- ❖ used as one of several piers in a bridge will grow tight again because
- ❖ held fixed by the bridge. Perhaps the truth is that such teeth, so utilized,
- ❖ never recover from the state of disease in which they are at the outset.
- ❖ Something more than fixation, either through splints or bridges, is necessary to cure pyorrhea."

■ ■ ■

"RETURN, PLEASE, TO OUR original subject," said I. "Neither of you

- ❖ has solved the problem as yet. The first speaker told us that the
- ❖ poorer people must abandon the idea of bridgework and go back to
- ❖ plates. Thus far he agrees with Dr. Schamberg. But what of the rich?
- ❖ Must they risk septic bridgework just because they have money?"

■ ■ ■

"NOT AT ALL," said Bridgeworker No. 3, a quiet man, but one who never

- ❖ speaks foolishly when he does speak. "But the rich, with all their money,
- ❖ are often fools. They pay out large sums to men who talk better, much
- ❖ better, than they can work. Let the rich man learn this, that health is
- ❖ priceless. It is the one thing that his money cannot positively buy. Then
- ❖ when he appreciates his health at its full value, if he needs some artificial
- ❖ substitutes, which he would not had he grown wise in time; but needing
- ❖ bridgework, let him consult a really skillful, conscientious man; a
- ❖ man who not only knows how to construct bridgework, but likewise
- ❖ where to place it as well as where not to place it. Having found such a
- ❖ man, let him cheerfully pay the price, and mark this, if he be really a
- ❖ rich man, and if he be skillfully served so that the priceless treasure,
- ❖ health, be restored to him, then should he return to that bridgeworker
- ❖ and say, 'Construct a good piece of work for one that cannot pay your
- ❖ fee, and send the bill to me.'"

■ ■ ■

"AMEN TO THAT," said Bridgeworker No. 4. "And, by the way, if you

- ❖ know a man like that, please give him my address. I like to work for
- ❖ appreciative folks. But, seriously, let me say a word. To my mind, the
- ❖ one thing which both patient and operator have yet to learn is this: The
- ❖ structure cannot be stronger than the foundation. Too many patients
- ❖ expect that fine bridgework may be placed upon weak, if not actually
- ❖ diseased old roots. After spending a large sum on such a bridge, very
- ❖ often the bridge is lost with the piers, and a new bridge must be attached
- ❖ to adjacent sound teeth. This is the course which might better have been
- ❖ followed in the first place. Had all the doubtful or diseased teeth been
- ❖ removed first, and nothing but living teeth and healthy gums been
- ❖ present, then the chances of success would have been enhanced a hundred
- ❖ fold. Beginning with a tooth having a living pulp, the bridgeworker
- ❖ should be able to remove it and properly fill the root canals, for it is
- ❖ the canals of dead and diseased teeth that make ninety per cent. of all
- ❖ the root canal problems. Moreover, if the pulp be alive at the outset,
- ❖ one would have better tooth bone to deal with and frequently the face
- ❖ of the natural tooth can be saved, and even protected, with the attachment
- ❖ utilized to support that end of the bridge."



Items of Interest

"THERE IS NO DOUBT," said the Periodontist, "that your opinion is sound.

- ❖ Certainly, bridgework placed in a healthy mouth, on healthy roots,
- ❖ though pulpless, will endure longer than work constructed with doubtful skill upon teeth of doubtful health."



"MEANWHILE," said I, "or until all dentists know how to fill root canals,

- ❖ or until all dentists who construct bridges shall have learned when,
- ❖ how, and where to supply them, let the Poor go bridgeless to bed!"



"AND MAY THEY enjoy healthful sleep. Amen!"





National Society Meetings.

PANAMA-PACIFIC DENTAL CONGRESS, San Francisco, Cal., August 30 to September 9, 1915.

Secretary, Dr. Arthur M. Flood, 240 Stockton St., San Francisco, Cal.

State Society Meetings.

ARIZONA STATE DENTAL SOCIETY, date and place will be announced later.
Secretary, Dr. J. L. O'Connell, Phoenix, Arizona.

ARKANSAS STATE DENTAL ASSOCIATION, Little Rock, Ark., May 13-15,
1915.

Secretary, Dr. W. B. Dormon, Nashville, Ark.

COLORADO STATE DENTAL ASSOCIATION, June 17, 18, 19, 1915.
Secretary, Dr. Earl W. Spencer, 119-120 Pope Block, Pueblo, Colo

FLORIDA STATE DENTAL SOCIETY, Pass-a-Grille, Fla., June 9-11, 1915.
Secretary, Dr. Alice P. Butler, Gainesville, Fla.

GEORGIA STATE DENTAL ASSOCIATION, Atlanta, Ga., June 17-19, 1915.
Secretary, Dr. M. M. Forbes, 803 Candler Bldg., Atlanta, Ga.

**Items of Interest**

ILLINOIS STATE DENTAL SOCIETY, Peoria, Ill., May 11-14, 1915.

Secretary, Dr. Henry L. Whipple, Quincy, Ill.

INDIANA STATE DENTAL ASSOCIATION, Indianapolis, Ind., May 18-20, 1915.

Secretary, Dr. A. R. Ross, Lafayette, Ind.

IOWA STATE DENTAL SOCIETY, Waterloo, Ia., May 4-6, 1915.

Secretary, Dr. C. M. Kennedy, Des Moines, Iowa.

KANSAS STATE DENTAL ASSOCIATION, Topeka, Kans., May 25-27, 1915.

Secretary, Dr. A. L. Benton, Garnett, Kansas.

KENTUCKY STATE DENTAL ASSOCIATION, Ashland, Ky., June 8-10, 1915.

Secretary, Dr. Chas. R. Shacklette, The Atherton Bldg., Louisville, Ky.

LOUISIANA STATE DENTAL SOCIETY, Grunewald Hotel, New Orleans, La.,

June 3-5, 1915.

Secretary, Dr. P. Trowbridge, Franklin, La.

MAINE DENTAL SOCIETY, Portland, Me., June 28-30, 1915.

Secretary, Dr. I. E. Pendleton, Lewiston, Me.

MARYLAND STATE DENTAL ASSOCIATION, Baltimore, Md., June 10-11, 1915.

Secretary, Dr. F. F. Drew, 701 N. Howard St., Baltimore, Md.

MASSACHUSETTS DENTAL SOCIETY, Boston, Mass., May 5-7, 1915.

Secretary, Dr. A. H. St. C. Chase, Everett, Mass.

MINNESOTA STATE DENTAL ASSOCIATION, date and place will be announced later.

Secretary, Dr. Max E. Ernst, 614 Lowry Bldg., St. Paul, Minn.

MISSOURI STATE DENTAL ASSOCIATION, Golden Jubilee Meeting, Jefferson City, June 10-12, 1915.

Secretary, Dr. S. C. A. Rubey, New York Life Bldg., Kansas City, Mo.

MONTANA STATE DENTAL SOCIETY, date and place will be announced later.

Secretary, Dr. F. W. Adams, Chicago Block, Billings, Montana.

NEBRASKA STATE DENTAL SOCIETY, Omaha, Nebraska, May 18-20, 1915.

Secretary, Dr. H. J. Porter, Cambridge, Nebr.

NEW HAMPSHIRE STATE DENTAL SOCIETY, Weirs, N. H., June 22-24, 1915.

Secretary, Dr. Louis I. Moulton, 15 No. Main St., Concord, N. H.

Society Announcements

NEW JERSEY STATE DENTAL SOCIETY, Asbury Park, July 21-24, 1915.

Secretary, Dr. John C. Forsyth, 430 E. State St., Trenton, N. J.

NEW MEXICO STATE DENTAL SOCIETY, Albuquerque, N. M., date will be announced later.

Secretary, Dr. J. J. Clarke, Artesia, N. M.

NEW YORK STATE DENTAL SOCIETY, Albany, N. Y., May 13-15, 1915.

Secretary, Dr. A. P. Burkhardt, 52 Genesee St., Auburn N. Y.

NORTH CAROLINA DENTAL SOCIETY, Wrightsville Beach, N. C., June 23-25, 1915.

Secretary, Dr. R. M. Squires, Wake Forest, N. C.

NORTH DAKOTA STATE DENTAL SOCIETY, Fargo, N. D., May 11-12, 1915.

Secretary, Dr. Tom Smith, Langdon, N. D.

OHIO STATE DENTAL SOCIETY, Columbus, Ohio, December 7-9, 1915.

Secretary, Dr. F. R. Chapman, 305 Schultz Bldg., Columbus, Ohio.

PENNSYLVANIA STATE DENTAL SOCIETY, Reading, Pa., June 22-24, 1915.

Secretary, Dr. L. M. Weaver, Philadelphia, Pa.

TENNESSEE STATE DENTAL ASSOCIATION, Sewanee, Tenn., June 24-26, 1915.

Secretary, Dr. C. Osborn Rhea, 625½ Church St., Nashville, Tenn.

TEXAS STATE DENTAL ASSOCIATION, Galveston, Texas, May 19-22, 1915.

Secretary, Dr. W. O. Talbot, Fort Worth, Texas.

UTAH STATE DENTAL SOCIETY will meet in San Francisco, Cal., during the Panama-Pacific Dental Congress in August, 1915.

Secretary, Dr. E. C. Fairweather, Boston Bldg., Salt Lake City, Utah.

VERMONT STATE DENTAL SOCIETY, Burlington, Vt., May 19-21, 1915.

Secretary, Dr. P. M. Williams, Rutland, Vt.

VIRGINIA STATE DENTAL ASSOCIATION, Richmond, Va., Nov. 4-6, 1915.

Secretary, Dr. C. B. Gifford, Norfolk, Va.

WISCONSIN STATE DENTAL SOCIETY, Oconomowoc, Wis., July 13-15, 1915.

Secretary, Dr. O. G. Krause, 1209 Wells Bldg., Milwaukee, Wis.

Vermont Board of Dental Examiners.

The next meeting of the Vermont Board of Dental Examiners, for the examination of candidates to practice in Vermont, will be held at the State House, Montpelier, commencing at 2 P. M., on June 28, 1915, and continuing for three days.

To be eligible for examination a candidate (1) must be twenty-one years of age, (2) must be a graduate of a high school of the first class, and (3) must be a graduate of a reputable dental college.

Applications must be in the hands of the Secretary not later than June 20th. For further information apply to

St. Johnsbury, Vt.

GEORGE F. CHENEY, Secretary.

Arkansas Examination.

The Arkansas State Board of Dental Examiners will hold an examination at the Marion Hotel in Little Rock, Arkansas, on Monday, Tuesday and Wednesday, June 21, 22 and 23, 1915. Applicant must be a graduate of a reputable dental school. Examination theoretical and clinical. Application and fee should be in the hands of the secretary fully two weeks before the examination. For further particulars write

IRVIN M. STERNBERG, Secretary.

Fort Smith, Ark.

Iowa State Board of Dental Examiners.

The next meeting of the Iowa State Board of Dental Examiners for the examination of candidates for licenses will be held at Iowa City, Iowa, commencing Monday, June 7th, at 9 A. M.

For application blanks and so forth address the Secretary,

417 Utica Bldg., Des Moines, Iowa. DR. J. A. WEST.

Montana State Board of Dental Examiners.

The Montana State Board of Dental Examiners will hold a session for examination on July 12th, 13th, 14th and 15th.

DR. G. A. CHEVIGNY, Secretary.

Butte, Montana.

Pennsylvania State Board of Dental Examiners.

The regular examination of the Pennsylvania Board of Dental Examiners will be held in Musical Fund Hall, Philadelphia; and the College of Pharmacy Building, Pittsburgh, on Wednesday, Thursday, Friday and Saturday, June 9, 10, 11 and 12, 1915. The examination in practical work will be held on Wednesday at 1 P. M., at the Evans' Institute, Philadelphia, and the University of Pittsburgh, Pittsburgh. Application papers can be secured from the Department of Public Instruction, Harrisburg. Further information can be secured from the secretary.

ALEXANDER H. REYNOLDS, Secretary.

4630 Chester Avenue, Philadelphia.

Ohio Valley Dental Society

The Ohio Valley Dental Society will hold its semi-annual spring meeting and banquet at the Hotel Berry, Athens, Ohio, April 14, 1915.

DR. M. D. HARTINGER, Secretary.

Middleport, Ohio.

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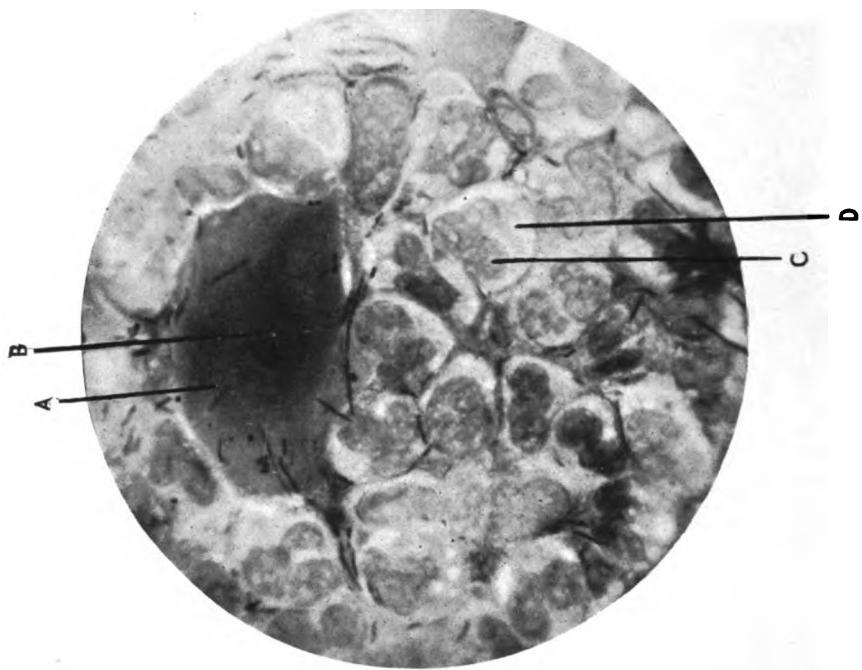
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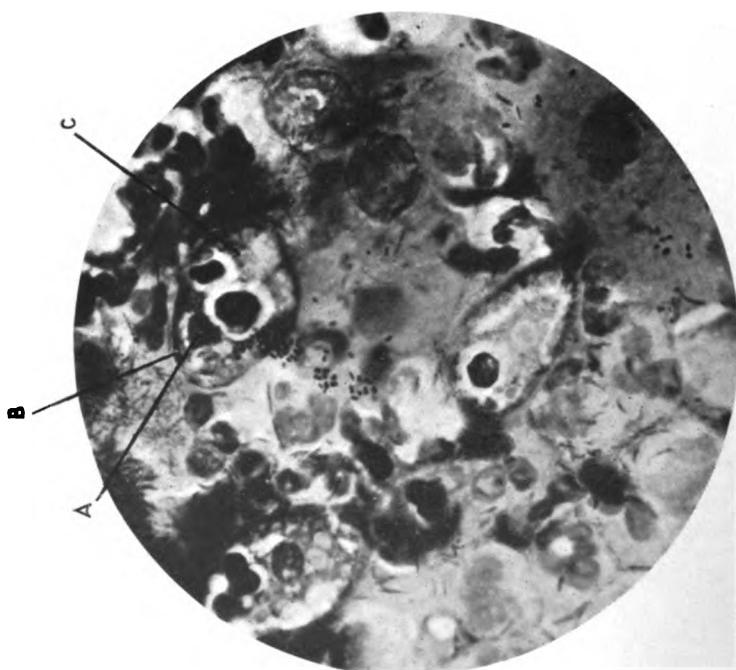
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- B**
- a. Nucleus of epithelium, blue.
 - b. Protoplasm or body, pink.
 - c. Protoplasm, pale pink.
 - d. Nucleus of pink cell, dark blue.



- A**
- a. Interior, pale blue.
 - b. Rim of auricle, dark blue.
 - c. Inclusion, bright red.





The Identification of Amoebæ in Dry Smears, from Cases of Pyorrhea.

By THOMAS LE CLÉAR, New York City.

In the last few months several articles have appeared in the dental and medical journals dealing with amoebæ as the cause of pyorrhea, and the treatment of pyorrhea with an amoebicide, such as emetin. Bass and Johns (*New Orleans Medical and Surgical Journal*, November, 1914) describe the method of detecting amoebæ in fresh, unstained suspensions in warm physiological salt solution, and also give a method of double staining dry smears. The method of examining for motile amoebæ has the following disadvantages: The material must be examined immediately; the salt solution, slide and microscope stage must be warm, and the amoebæ under these conditions retain their motility for only ten to fifteen minutes.

As the dentist could not, as a rule, stop to make such an examination while treating patients, it occurred to the writer that it would take but a moment of the dentist's time to spread some of the scrapings on a glass slide and place same aside for staining and examination at a more convenient time.

The method of obtaining material, spreading, drying and staining, which the writer has used with very satisfactory results, is as follows:

Method of Making Smears.

If any pus is observed and can be pressed out, it is wiped off and discarded. With an instrument or a toothpick remove scrapings from the bottom of pus pockets, or between teeth and gums in places where there is a suspicion of the beginning of

pyorrhea. This material is then smeared in the centre of a glass slide and allowed to dry; pass quickly through the flame of a Bunsen burner five or six times in order to fix it firmly on the slide; stained cold with carbol fuchsin solution for fifteen seconds; wash with water and stain with Löffler's methylene blue solution for thirty seconds; wash with water; blot gently with filter paper; dry and examine, preferably with a $1/12$ inch oil immersion lens and an eye piece of such a power as to give a magnification of approximately 500 diameters. This method of double staining gives results which admit of a ready differentiation of amoebæ from pus cells and epithelia (about the only elements which are liable to occur in such material, which might possibly be mistaken for amoebæ), and also stain the bacteria very satisfactorily.

Amoebæ, when thus prepared, are usually two or three times the size of pus cells. They appear round or ovoid, and are occasionally surrounded by a clear zone. Their rims take a blue or purple stain, while their inclusions stain pink or light red. The interior of the amoebæ frequently resembles a net work which stains a pale blue, much lighter than the rim. (See Fig. 1.)

Pus cells, on the other hand, may be distinguished as follows: The protoplasm or body of pus cell stains a rather indefinite pale pink, and contains two, three or four irregular shaped nuclei which stain dark blue. They are usually present in abundance, whereas from one to six amoebæ may be found in some fields and none in others. (See Fig. 2.)

Epithelia, occurring in such proportions, are usually much larger than amoebæ, and have a single nucleus. The protoplasm stains pink and the nucleus blue (see Fig. 2). In this connection it should be kept in mind that cells often take up stains differently in different parts of the same preparation, especially where there is considerable difference in thickness. Therefore the colors will not always be just as described, but in fairly thin preparations they will usually be found so.

The writer hopes that this description of stained preparations will help others to identify the amoebæ, which appear at this time to cause so much discomfort either as the cause or at least as a contributary cause of pyorrhea and its many complications. Certainly the detection of amoebæ in early cases ought to be of considerable value to the patient. Examinations before and after treatment in well-marked cases would undoubtedly be of value in determining the efficacy of treatment.

In closing, the writer desires to express his thanks and indebtedness to Dr. J. H. Stebbins for making the photomicrographs.

Laboratory of Fraser & Company,
50 East 41st St., New York.



A Cure for Pyorrhea Is no New Thing in Dentistry.

By PAUL R. STILLMAN, D.D.S., New York City.

There has been so much laudatory talk in the past few months concerning emetin and its use in the treatment of pyorrhea that an opinion from one who is giving his professional time to this and its allied conditions may be interesting. One fact seems to be entirely overlooked by those who have identified themselves with this new treatment, and it is, *that a cure for pyorrhea is no new thing in dentistry*. Pyorrhea has been successfully treated since the days of Dr. Riggs, and it is the writer's opinion that there are at present at least fifty men who are successful in treating the disease.

The use of emetin as a "cure," since the reports on its use by Barrett*¹ in Philadelphia, and Bass and Johns*² in New Orleans, has been very generally adopted by the general practitioner, both in dentistry and medicine. It is being widely advertised as a specific by those who are interested commercially in its sale. Much newspaper and magazine space has been given to this new remedy, lauding it as a "new cure."

A large majority of the men who are exploiting it are those who have had no success with the proven methods of treatment, and who are not trained in the technique necessary in effecting cures. I wish to caution these men who have taken cases for treatment with emetin that the harvest is not yet here, bright as the prospect may seem to them.

There are three certain, undisputed factors in the treatment of pyorrhea that never can be overlooked in its successful treatment.

1st. The most important symptom to overcome is trauma. All loose teeth that have occlusion are found to possess this symptom. The trauma must be reduced by grinding, and the tooth ligated in such a manner as to insure stable fixation. Until this has been done there will be no progress.

2nd. Hygiene must be taught and established as a habit. The mouth must be made clean.

3rd. All concretions must be removed and all necrotic root surfaces made surgically clean. This must be accomplished by "planing," or "curetting," according to the instruments employed.

When these three things are correctly accomplished, the case will be so far advanced in convalescence that the thought of injecting emetin will not enter the operator's mind.

There is no easy method of curing pyorrhea, but there are some

*¹ *Dental Cosmos*, August and December, 1914.

*² *Journal American Medical Association*, February 13, 1915.

thousands of cases cured each year by scrupulously conscientious operators, who know their subject and who have had sufficient zeal and ability to master the technique necessary to secure results. Cases cured in this manner *stay cured*, as any competent periodontist will attest.

The Emetin Error.

By JULES J. SARRAZIN, D.D.S., New Orleans.

During the latter part of August, or the beginning of September, 1914, without reference to the previous labors of Chiavaro, Barrett and Smith, in the same field, the New Orleans morning and afternoon papers were aglow with a specific treatment for Riggs' disease, based on amoebic etiology, promising magic results. Some weight to this idea of an "easy road to Heaven" was given by interviews with reporters, which were published. My first impulse was to hold back judgment, expecting such public newspaper talks to be disclaimed as not being authorized, even though the amoebic etiology and treatment were affirmed, which at that time seemed incredible to me, because of the utter disregard for infected cementum and carious bone then set forth. However, on September 14, 1914, at a meeting of the Orleans Parish Medical Society, the amoebic etiology and therapy were promulgated on lines quite identical with the above-mentioned newspaper articles.

Not having yet made any tests, but being strongly impressed by the well-known systemic factors and local etiology of Riggs' disease, and convinced that a sincere but dangerous error was being promulgated, I then limited myself to pointing to it in broad terms, cautioning against a blind and free use of the treatment before its value was established.

On October 26th, again at a meeting of the Orleans Parish Medical Society, the emetin-pecac treatment was presented, based on some two hundred cases successfully treated, the amoeba buccalis being the criminal, it being carried from mouth to hand and hand to mouth, or from mouth to street car rail, thence to hand, to toothpick and to gums, the toothpick playing a most dangerous part in the infection carrying process. I fully agreed that the deleterious results following toothpick traumatism rendered it an undesirable instrument in usual mouth conditions, but I also pointed out that the toothpick amoebic etiology was unnecessary to Riggs' disease, because inspissated mucus on teeth necks, charged with dead epithelial cells and infectious bacteria, furnished the local part of the etiology by themselves, aggravated by lime salt deposits when present, while the resistance of tissues was lowered by the usual dystrophic atrophy of the human maxillary and mandibular structures.

**Results of
Treatment
with Emetin.**

I had by that time been testing the emetin-ipecac treatment, and stated my results. Tumified, bloody gums, in habitually neglected mouths, had markedly improved as a result of removing salivary calculi and brushing away a part of the septic films off teeth necks. Results from mouth hygiene are generous beyond the proportion of its thoroughness, although perfect results come from perfect technique only. Fluid extract of ipecac, or even plain water, would benefit tissues habitually infected by filth, the patient's attention having been drawn to mouth cleansing, it being done a little more and better than usual. I also reported at the same time that in no case of loose teeth, or suppurating pockets, or carious alveoli had I seen any objective improvement from the ipecac-emetin treatment. Discomfort to patients from such teeth usually lessens as any treatment is instituted. This implies no real change of conditions, and, as time demonstrates, no cure. Of course, I had abstained from any systemic measure other than emetin hypodermically administered and locally from going beyond the removal of chunky deposits off roots. I was testing the amoebic emetin-ipecac treatment clinically. In some of those cases hypodermics of emetin had been given for six consecutive days, followed by weekly injections, doses ranging from $\frac{2}{3}$ gr. to 1 gr., while ipecac was irrigated in fundi pockets and used on the tooth brush, with no real improvement in over five weeks.

My surprise became great on October 28th, **Further Development** when, at a meeting of the First and Second Districts of Amoeba Theory. of the Louisiana State Dental Society, I heard the

amoebic theory married to the infective mucus film etiology which I had mentioned two days earlier, instead of the amoebæ being carried on toothpicks. Since amoebæ feed off the protein molecule broken up by infectious bacteria, it is unquestionably proper to locate them in inspissated mucus films, which supply the true local etiology of Riggs' disease. Bacteriologists are generally agreed that amoeba buccalis has no pathological significance, and feed as just mentioned, while, on the other hand, the amoeba hystolytica of Schaudinn and Craig, and the tetragena of Hartmann and Vierick, is a tissue burrower.

The amoebic etiology has just recently merged into still another phase, making the amoeba buccalis the carrier of pathogenic germs into alveolar pockets. Since laboratory experiments upon autolized tissue, amoebæ in symbiosis with infectious bacteria, show the former throwing off the latter after feeding on the protein molecule freed by them, it is not at all surprising that pathogenic bacteria should be present with amoebæ buccalis. For a few infectious bacteria thus located, there would be myriads of them independently infecting soft tissues, the leukocytes

of which are neither numerous nor active enough to destroy bacteria as rapidly as they gain entrance. If we would remember that Riggs' disease requires two causes to produce its suppurative stage, we would be less easily disturbed by any fanciful etiology ascribed to it. The dystrophic atrophy of alveolar tissues, due as much to the fact that arterial blood must be pumped upwards to them, because of their being transitory structures, explains why the suppurative process easily results from adjacent infectious cervical films or deposits. We there have the predisposing, or less resistant, systemic condition, and the determining local factor. Under favorable conditions the latter is resisted by the former. Again, in the absence of local infection, but with destruction of alveoli due to insufficient blood nourishment, teeth became lost from lack of support. With these facts in view, any imaginative etiology is puerile.

Anna Williams, of the Park Laboratory of the New York Board of Health, has just been conducting a series of tests where amoebæ buccalis have been found in :

Normal children's mouths, 50%

Slightly diseased adult mouths, 80%

Mouths with pus pockets, 90%

It is noteworthy that a large proportion of the children were infants. Amoebæ are so widely distributed in nature that no surprise need result. As we are not wont to expect Riggs' disease in the mouths of children, these investigations rather point to the increased presence of amoebæ in more luscious pasture grounds, as a result of favorable conditions for their nourishment, but not as a cause of disease.

There is here no intention to question the destruction of amoebæ buccalis by emetin or ipecac. This is quite beyond doubt. On the other hand, there is strong reason to believe that these amoebæ are unjustly accused of producing conditions which they only enjoy; that the health of innocent victims are being threatened by strepto and staphylococci allowed to carry on infection while amoebicides constitute treatment. Unquestionably it would seem desirable to sound that warning as loudly in the public's ear as was the sincere but misleading error of amoebic etiology. It would be far better for some teeth to be speedily sacrificed than to jeopardize health by maintaining dangerous foci of infection.

**Tests of
Emetin
Treatment.**

All the successive negative amoebic treatment results which I have seen have for some time convinced me that the amoebic etiology belongs to that large class of theories which may be applied only before conclusive tests are made, and I regret it sincerely, first, because I have faith in the sincerity of the men who have devoted great energy and time to these original researches, and

second, because hope for a rapid and easy cure, which would have been a boon to humanity, is blasted. One test alone could outweigh painstaking, thorough clinical evidence based on intimate knowledge of Riggs' disease pathology. This would be the production of the suppurative disease in the mouth of a fairly healthy subject affected with superficial gingivitis, chair and home oral prophylaxis being perfectly carried out, while following the latter nightly, at bedtime, gingival margins would be generously smeared with a pure culture of amoeba buccalis. Such a test would carry weight if conducted with flawless details. Considering that cultures of amoebæ on autolized tissue are not infrequent laboratory technique, such cultures would be accessible.

Whenever iodine is painted on gums, or any germicidal solution thereon, or in pockets, is used, other than emetin or ipecac, a reliable factor is brought in the treatment which destroys micro-organisms other than amoebæ, producing results due to reaching the correct etiology of the disease. Improved conditions resulting should not then be credited to the emetin-ipecac treatment. A mouth wash containing iodine will also be similarly misleading if used in connection with the amoebic treatment. Likewise, the so-called "planing" of roots removes material infected by germs other than amoebæ, and must also be avoided in testing the merits of the emetin treatment.

A factor which sometimes misleads experimentation with emetin hydrochlorid is that it is mildly germicidal to pathogenic germs, such as streptococci and staphylococci.

Since the amoebæ buccalis do not occur in tissues far beyond necrotic areas, but are present in and at the fundi of pockets filled with pus, and bounded by carious bone and infected cementum, it is reasonable to deduce that emetin hypodermics, while they may serve to lessen the danger of systemic infection, play a little part in inhibiting micro-organic growth in Riggs' pockets, where, of course, no blood circulates. Quite similarly, vaccines may exert a favorable influence on systemic morbid manifestations resulting from infection by germs identical with those composing the vaccine, but, owing to the fact that no blood circulates through the pockets of suppurative Riggs' disease, it is idle to expect that either these pockets themselves or their contents may be affected by such hypodermic injections. It is what is done locally and directly into the pockets themselves which is the beneficial procedure in both instances. Therefore, irrigating pyorrheal pockets with emetin or ipecac, owing to a weak germicidal action, will lessen, without completely checking the pus exudates in chronic cases. This diminution is more marked after irrigating pockets for the first time than at any subsequent repetition, simply because pus does not accumulate as thickly in such lesions in



Items of Interest

twenty-four or forty-eight hours, as in the preceding mouths during which treatment was either completely omitted or done haphazardly. In other words, due to far greater germicidal power to truly pathogenic micro-organisms, if a solution of iodine crystals had been substituted for topical use, the control of suppuration would have been far greater, although not complete without the removal of local infectious and irritating factors, backed by adequate systemic measures where indicated.

Again, it may be easily understood why results misleading and deceptive to the casual, inexperienced or superficial observer of Riggs' disease conditions may occur in the acute stages under emetic-ipecac treatment before old chronic pus pockets have existed. There yet being no such pus pockets on roots, the topical use of ipecac inhibits the surface growth of streptococci and staphylococci, while blood hypodermically charged with emetic protects the gums it permeates. Add the usual fact of more and better mouth hygiene having just been instituted, and gingival conditions would inevitably improve before the formation of pus pockets.

The local rôle played in the production of Riggs' disease by insipidated mucous and bacterial cervical plaques is so plain to students of that etiology, the adjacent tissues succumbing to that infection, frequently coupled as it is with irritation from hard deposits, and habitually in the presence of dystrophic tissue atrophy, that it seems puerile to train Riggs' observers to conjure innocent non-pathogenic amoebæ to cause lesions they only inhabit to feed therein, and the pathology of which does not suggest their concurrence.

Since it has recently become common routine medical practice to treat Riggs' disease hypodermically, or by mouth only, it would behoove me as well to announce a specific treatment for a systemic disease, the phases of and therapy for which I am ignorant of, except from hearsay of medical practitioners, with limited special experience therewith, and to then loudly herald my new system of treatment before it had been thoroughly tested in professional circles. Results from such well-meaning errors are rendered harmful in proportion to the weight of authority which sincerely promulgates them, countless healths and lives being threatened by septic oral conditions, which should have been corrected; in many cases extraction being far preferable to their continuance. The gravity of the situation is increased by local directions for mouth hygiene being given by some physicians in connection with the new specific emetic treatment, which disregard the fundamental etiology of infectious bacterial plaques on approximal teeth necks, advising brushing teeth without stimulating gingival circulation, and without even passing floss between them. Indeed, there would be vastly more oral prophylaxis in disre-



garding the tooth brush entirely, but insisting instead on thoroughly rubbing a minute flat tape on all approximal teeth faces and necks, mesial and distal, and employing a clean rag to break up thickened mucous films on all exposed dental surfaces, even though gingival stimulation, along with other well-established and proven oral prophylactic measures, which rest on the combined experience of experts in that line, was discarded by medical men in assuming the rôle of mouth hygienists.

The paramount importance of patients constantly breaking up and removing infectious inspissated mucous films from all faces of teeth necks, and developing a highly polished surface thereat, especially mesially and distally, where septic deposits are otherwise left undisturbed, is easily realized by considering that infection otherwise causes the time-honored pathological stages of congestion, inflammation and suppuration wherever tissue resistance is lacking, as is usually the case in gingival ones. As to the amœbae buccalis, it is perfectly in accord with natural law that they should be feeding in the bacterial plaques mentioned, that they should pass on to recesses in gingival margins as invaded and diseased, and that as peridental tissues break down in the above-described etiological and pathological processes that they should occupy the fundi of pockets, where a more favorable pasture invites them: stagnant pus cells, not red blood corpuscles. Like ducks, they should migrate to more favorable feeding grounds, but not as fast. They are unquestionably apt to be present, but not accountable as pathological factors. Etiology and clinic both thus point.

What Is the Highest Function of the Dental Profession?

By MAURICE WILLIAM, D.D.S., New York.

The first quarter of the twentieth century will go down in dental history as a period of reconstruction. That dentistry is seeking to find itself is evident even to a most casual observer. It would be almost an impossibility in these days to open a dental journal and not find at least one article bearing on the important question of recent tendencies in the dental profession.

The editor of the ITEMS OF INTEREST has to his credit a number of contributions on this important phase of current dental history. The editorial in the March issue, "*The Greatest Problem of the Day in Dentistry*," is most timely. In it he has marshalled all the facts bearing upon a very complex problem, but tactfully shrinks from the task of rendering a solution, and would rather put it up to his readers. His closing line, "What shall we reply?" is a challenge to every serious minded member of the dental profession.

I cannot resist the temptation to be one of the many to accept that challenge. One can but venture the hope that all the ink that will be spent by various contributors will result in something concrete which may react favorably both to our profession and to humanity.

**The Ideal
Root-Filling.**

It is now pretty generally accepted by the profession that root work has taken on the importance of a major operation when considered from the standpoint of the possible consequences of its failure.

Such men as Dr. Rhein and Dr. Ottolengui have scientifically demonstrated the technique which must be applied to obtain certain results. The success of the operation cannot be determined without proper radiographic checking. Root work done in any other manner may have dire consequences. The question naturally arises, "What would be the cost to the patient for proper root work?" Fees for services of this character, including radiographs, would come to anywhere between \$25 and \$100 per tooth, which is another way of saying that proper root work is out of the question for the average man, woman or child.

If we are to judge from the income-tax returns, but one-half of one per cent. of the American people enjoy an income of over three or four thousand dollars per year, which is approximately \$60 to \$80 per week. By far the vast majority of the people must get along on anywhere between \$800 to \$2,000 per year. How is it possible for the great majority to pay for perfect root canal work? The thing is simply out of the question. If it is true that improper root work is inimical to life, then society is doomed, unless another way out is to be found.

Suppose we now ask ourselves the question, "Why root work?" Is there no way of reducing the need for root work? Let us of the dental profession be honest with ourselves. Root canals must have fillings within them, God's or man's. Where is there the man who would dare make the claim that his root filling is superior to Nature's? Which, then, is the greater service that the dental profession can render, to preserve Nature's root filling or to substitute an artificial one? Surely the answer is obvious. With all due respect to our justly celebrated root canal wizards, I, for one, would rather have Nature's root fillings than theirs, even though they should offer to give me the benefit of their exceptional skill without charge. I am certain that both Dr. Rhein and Dr. Ottolengui would be the first to endorse these views. So that after all, then, it is not entirely a question of the financial ability to pay, but goes far deeper than that.

**Medicine Versus
Dentistry.**

It seems to me that it is about time that the dental profession determined upon its true status. Unless this is done we shall keep on reasoning in a circle, dealing with effects, not causes, and willulti-

mately end in bringing down upon our heads the odium of society instead of its warmest approbation.

Is ours a specialty of medicine? Are we members of the healing art? This we must now determine once and for all, if we are ever to get at a solution of the vexing problems that confront us daily. I wish to be placed on record as holding the position that ours is not a branch of medicine and that we are not members of a healing profession. Ask the average dentist to tell you what is the fundamental difference between the medical man and the dentist in relation to the diseases he is called upon to treat? He will either not know what you are talking about or will not be able to give you the correct answer. And yet the correct answer to this question is the key to the solution of our problems.

The physician and the dentist approach the diseases that they are called upon to treat from *diametrically opposite premises*. Broadly speaking, the physician deals with diseases that are *curable*, whereas the dentist in the main is called upon to treat diseases which are *incurable*. In order that there may be no misunderstanding about this, it may be well to remember that the definition for curable is "to restore to normal, *i. e.*, as Nature first created it. Dental tissue once destroyed is never restored by Nature. If this be true (and where is there the man with the temerity to deny it?) what is the *greatest* service that the dental profession can render humanity? The greatest service that the dental profession can render humanity is to educate it to the fact that *we cannot cure dental diseases*, but that we can do much to prevent them. We must give to the public all our knowledge concerning the relation of mouth conditions to general health and of the importance of saving the natural teeth. Dental science can be of invaluable assistance in the preservation of the natural teeth.

Dental Service.

The dentist's services fall under three distinct heads; in the order of their importance they are as follows:

1.—To educate the public as to the relation of mouth conditions to general health, the importance of saving the natural teeth and to assist in their preservation.

2.—To detect incipient caries and to replace it with an artificial substitute.

3.—And least important, the replacing with artificial substitutes some or all of the teeth.

Is there a dentist living who would quarrel with my arrangement of the relative importance of the three subdivisions of our service to society?

It is admitted, then, as a fact that the third subdivision of our service is the least constructive to our patients. And yet what do the facts

teach us? That this, the least constructive service we have to offer, is practically the only service that the great mass of humanity receives at our hands. Ask the average man or woman to tell you what is the highest function of the dental profession and the answer invariably will be, "To fill teeth and make false teeth." This is not to be wondered at in the least. It is the direct result of the education we have been imparting. Much encouragement may be gathered from this, for it proves how amenable society is to education.

A Practical Method for Discharging Our Highest Function.

We have seen that our highest function is that of teachers. Our first duty to society is to educate it in the knowledge that the dental profession cannot cure dental diseases. There is no such thing as a cure for dental diseases. Society must be made to realize that the greatest service that the dental profession has to offer is to assist in the preservation of the natural teeth and in the maintenance of a healthy mouth; that the failure to maintain healthy mouth conditions leads to systemic diseases, which undermine health and vitality, and may lead to premature death. These fundamental truths we must bring to society through the medium of lectures, newspapers, magazine articles, pamphlets, and any other method which could be made to serve the purpose.

Just as soon as society is armed with the facts in our possession it will at once set about an effort to stamp out the frightful scourge which is undermining the vitality of the nation. Public sentiment will be roused to a high pitch. The warning cry sounded by us will be taken up by every newspaper and publicity agency in the country. Legislative halls will ring with stirring speeches, all having as their text, "To arms, to arms! against the insidious enemy within our midst; our greatest asset, the nerve, bone and sinew of our people, is at stake, the vitality of our nation must be protected, let the cost be what it may." Efficiency experts will be called upon to study the problem. The report of their findings will amaze the nation. They will report that there are more sound cattle in the nation than sound men, that our workers are only fifty per cent. healthy, and that their capacity to produce wealth is thus automatically limited. Political economists will take up the study of the question, and will show us the frightful economic waste traceable to this one cause. They will show the relation of body diseases (many of which have their origin in faulty mouth conditions), to the need for hospitals, sanitoria, alms-houses, jails and prisons, and will prove with indisputable figures that the greatest economy that the State could practice would be to assume the responsibility for the education of its people on all subjects relating to their physical health.

Then, and then only, will the dental profession be recognized at its true worth. The State will look to us to stamp out preventable

diseases. We shall become social servants, gaining our livelihood in protecting the health of society rather than profiting through the diseases that afflict our fellowmen.

Am I an impractical visionary, am I a utopian dreamer, a speculating idealist, or is there just ground for believing that the dream of to-day is to be the reality of to-morrow? I claim that the solution that I present is not only practical, but it is *inevitable*. Society will not go on forever paying the penalty of ignorance. We have too long already kept from it the knowledge so essential to its welfare. The dental profession can never atone for its crimes against humanity. We can only hope that society will show a magnanimous spirit and will not visit upon us the only punishment which is fitting the crime—the contempt of our fellowmen. Already is there to be heard ominous rumbling of protests from every side.

When a man like Dr. Osler makes the statement that "more physical deterioration is caused by defective teeth than by alcohol," it would be difficult for the dental profession to clear itself of the charge that it has been satisfied to permit such a frightful condition to prevail without sounding a note of warning.

When a man like Dr. Wiley makes the statement that "one thousand children die daily in this country, and their deaths are due more to defective teeth than to any other trouble," he by those very words calls upon society to witness what frightful crimes the dental profession is guilty of in keeping to itself the knowledge which could prevent this ghastly slaughter. And if side by side with these statements we put Dr. Hunter's classic arraignment of septic dentistry, society will be justified in drawing the conclusion that the dental profession fosters the conditions that have called forth notes of warning from Dr. Osler, Dr. Wiley, and others, so that it may coin the people's misery into dollars and cents for itself by foisting upon the people the septic dentistry which Dr. Hunter so justly condemns.

Society is already beginning to heed the warnings, most of which come to them from outside of the dental profession. Can we afford to tarry for another single second in the discharge of our greatest duty to society, even when considered only from the standpoint of our own honor and self-respect? It is no longer a question whether society shall have this knowledge, but rather one of who shall have the honor and glory of imparting this knowledge. Our choice lies here and nowhere else.

It remains but to prove that with the spread of the knowledge of mouth conditions as factors in the preservation of health must come an insistent and persistent demand for the assumption of social responsibility by society for the preservation of its health. With society in possession of the knowledge which proves the havoc wrought, because of its failure to gain the benefits from preventive dentistry, and with the lessons

learned from the application of the principles of preventive dentistry, it will become evident that, viewed from whatever angle, it will be economy of the most frugal kind for society itself to assume the responsibility for the protection of the health of its citizens.

I could quote from social workers, from hygienists and famous physicians, as well as economists, to prove the correctness of the above statement. The taxpayer is to-day burdened with taxes which are made necessary in order that society may cope with the results of its failure to assume the responsibility for the protection of the health of its citizens. If from no other standpoint than that of a money-making proposition, society is bound to assume responsibility. This is the age of efficiency and economy. Who is there who would rise to state that these principles will not be applied to our greatest natural resource, the health of the people?

**Dental Members
of Health Boards.** Not only is this sure to come, but it is *here already*. The foundation is laid in the shape of our

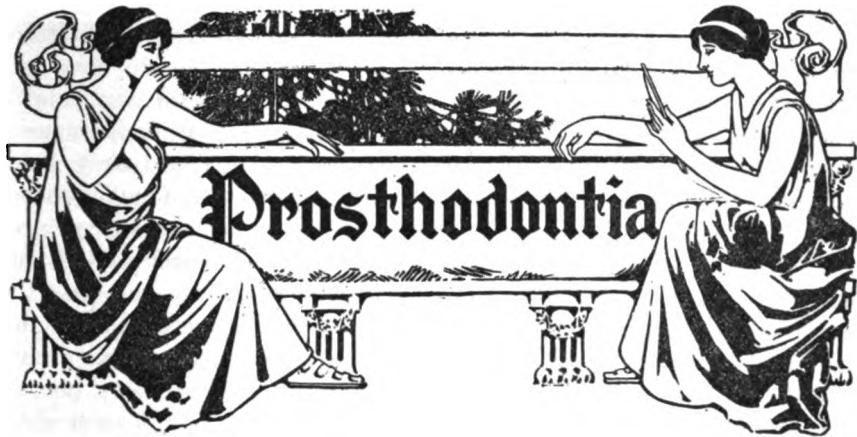
Boards of Health. These are continuously broadening their scope and to-day are extending their domain to the dental field, to the extent of municipal dental clinics, in all the important cities of the State. With increasing public sentiment which will result from a greater knowledge of the relation of mouth conditions to general health will come a proportional increase in the assumption of social responsibility for the dental needs of our citizens.

In the city of Detroit, Michigan, public sentiment on this question has reached such a stage as to result in the appointment of a dentist, Dr. Oakman, as Commissioner of Health. If in Detroit, why not in New York? If in New York, why not in Washington? Public sentiment is the determining factor. Let the public have the knowledge and this knowledge must crystallize in sentiment and this sentiment will in turn crystallize in the social responsibility by the people for the best interests of the people. With that accomplished, the dental profession will have found itself. Then, and then only, shall we be a united profession, for the conditions will no longer exist to make it possible for dental parlors and illegal practitioners to prey upon the sufferings of humanity and the premium which is now placed upon unethical practice will disappear.

Every dentist will give to society the best that the dental profession has to offer—preventive dentistry. A social servant giving of his best to humanity, in return for which society will grant him a self-respecting livelihood and the approbation and esteem of his fellowmen.

Thus will the problem be solved, both for the dental profession and for humanity.

Is this inevitable solution to have the recognition and support of the powers in the profession, or is it to come in spite of their indifference?



Bridgework Conductive to Health and the Instruments for Constructing it.*

By HERMAN E. S. CHAYES, D.D.S., New York.

In the year of 1910 there appeared in ITEMS OF INTEREST an article entitled "*Empiricism of Bridgework*," by the present writer, in which the methods of practicing this work were roundly and fully condemned. The attention of the profession was called to the inefficiency of the so-called "crown and bridgework" as an accessory to the health of the patient and to the vicious influence it was exerting upon health, because of the wrong principles upon which it was constructed. That article contained a promise made by the writer that he would substitute for these inefficient methods in vogue a method of crown and bridgework, the successful practice of which should make it conducive to the health of the patient, and the time has come when this promise is to be redeemed. May I be permitted to quote a short paragraph from the end of the article entitled "*Empiricism of Bridgework*"? In order to refresh our memory and revivify our hold upon the past, also in order to bring it home to the reader that no attempt has been made to evade the responsibility which any man assumes when he condemns a system, to substitute for it something which he feels is better for all concerned.

"Hence it will prove more sound to entirely ignore the fact that bridgework has existed at all, either as a science or as an art, because as practiced heretofore it cannot lay just claim to either name. And let us take our knowledge of physics and chemistry, geometry and general mathe-

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matics; of metallurgy and general mechanics; add to that our love for art, our developed esthetic sense, our honest desire to do our best, and, using the latter as a binder, let us combine the former with what knowledge we have of anatomy and physiology and the hygienic requirements of the maxillary region of the genus homo; let us start cautiously, build carefully, be sure of the indisputable correctness of our foundation beyond the shadow of a reasonable doubt, and then step by step let us proceed until we reach the limit of our knowledge and power to add correctly to what we have done; let us then sensibly cease and pass the result on to one more gifted to build what has been painstakingly and carefully constructed. Then only will the knowledge of crown and bridgework be a matter of cumulative evolution, and then only can we hope to earn for that department of dentistry the two names most cherished—'science' and 'art.' ”

The foregoing quotation is just as true to-day as it was five years ago, and it will be just as true five years hence, and the quotation which is about to follow, and which will be the last from the article on "*Empiricism of Bridgework*," will, perhaps, give the reader some idea of the amount of work involved in the substitution of what the writer considers a sane system of crown and bridgework for an insane one, and will tend to mitigate, if mitigation be needed, the writer's five years of comparative silence which has followed the publication of the article:

"I am conscious of the risk, and I do not dread the possible storm of antagonism, for I realize that I am dealing with men who can reason and think, and then, again, the major part of what is to follow consists simply of mathematical facts, axiomatic truths and physical laws adapted, modified at times, it is true, in order to make them elastic enough to fit and co-act with the life and activity of the maxillary region of the human anatomy, and that part of this which does not so consist of accredited mathematical facts is theory evolved along lines of logical reasoning, and by force of its own argument it must be accepted as reasonable and true until the contrary be proven."

This quotation also is as true to-day as it was five years ago, but perhaps with all your willingness to believe all that I have said, it may be more convincing if I offer you one potent piece of evidence of present-day empiricism, which more than all else would enable you to realize that I have not exaggerated regarding this work.

And now may I ask you who read this to read what is to follow this, and to read what is to follow that thereafter, written by the same hand, and, of course, emanating from the same source? May I ask you dentists all over this wide land to tell me

**What Is
Crown and
Bridgework?**

what it is you have been practicing under the name of crown and bridgework? Can you, any of you, answer my question when I ask for a definition of crown and bridgework—a clear, comprehensive, lucid, understandable and easily grasped definition of something which you have been practicing for thirty years or more? Can you give it to me? You cannot. And your literature, which runs into volume after volume, and your book-shelves loaded down with material, with bound copies of dental magazines and text-books which you used during your college term, all of them are barren; all of them fight shy of defining what you have been doing for thirty years or more, and what you are now ashamed to call crown and bridgework. Now let me ask you men who will read this to judge for yourselves and tell me what more profound empiricism can there be than that of the man who, while engaged in a task of constructing something, knows not what he constructs. What more deadly and devastating ignorance can be conceived than that of the bigot, the fanatic who does things in a certain way, not knowing what he does, but doing them solely because they who did these things before him pursued the same methods, with the same devastating results?

Does this seem harsh and unjust criticism? For if it does, I shall call upon some of you who read this to produce your scrap heap of bridges which you have removed from the mouths of various patients at different times. Would it not be a curious sensation for some of us to recognize in the scrap heap of our fellow practitioners a piece of our own handiwork, placed in the mouth of a patient some years back; placed there with such assurance that it was the right thing in the right place; that we were almost willing to write a book about it, singing its praises and advocating its use. Some years later this patient, in trouble, seeks the services of another man, and he, in his effort to relieve the patient of pay and pain, removes the vile and ill-smelling contrivance placed there some years ago by the first man, and replaces it with one of his own make, equally as good, but now somewhat more extensive and, of course, somewhat more expensive. This goes on in regular sequence until the last few roots have been gently and efficiently dislodged from the legitimate bed, and the patient's mandible and maxillæ present a smooth, rosy appearance, so favorable for the adaptation of complete dentures. That is a perfectly true and uncontrovertible statement, substantiated by all the scrap heaps of all the practicing dentists in this and other lands, and it should make us perfectly willing to forget what we knew or know of crown and bridgework, empirically practiced to the detriment of the public for so many years. And it should make us willing to begin anew, and begin properly by first acquainting ourselves with what it is we wish to do, and then proceed to do it.

**Bridgework
Defined and
Classified.**

Bridgework is the art of supplying edentulous spaces with artificial teeth in such a manner as to definitely limit their vertical and lateral displacement by using some natural teeth or roots which are present, as piers or abutments. Bridgework is divided into two systems—the fixed and removable system—and here the writer wishes to go on record with the statement that in dividing bridgework into two systems—fixed and removable—he controverts the possible accusation of his ultra radicalism. He is willing to concede that there is a system of fixed bridgework, or that it is possible that some men consider that there is a system of fixed bridgework, and that there is some room for the practice of such a system, and he has, therefore, attempted to work out a technique for such a system, which, while not being conducive to the health of the patient in the full sense of the words, yet partially condones the practice by rendering it less harmful than in the past. For the moment, then, we shall divide bridgework into these two systems—fixed and removable; both are classified in accordance with the teeth involved, as simple, compound, complex and cantilever.

Simple Bridge. First: A simple bridge is one where the artificial substitute and the piers are subjected to the same physical stress, that is, where the stress is exercised in the same direction. Example: Supplying a second upper or lower molar, using the third and first molars as abutments, or supplying the two upper or lower centrals, using the laterals as abutments (not an advisable procedure).

Compound Bridge. Second: A compound bridge is one in which the artificial substitute, by virtue of its position and acquired occlusal relation, is subjected to a stress different from that which works upon the abutments. Example: Supplying a lateral incisor, upper or lower, using the cuspid and central as abutments; or supplying a second lower bicuspid, using the first molar and first bicuspid as abutments.

Complex Bridge. Third: A complex bridge is one in which the artificial substitutes are subjected to a stress wholly foreign to the stress of the abutments, and where the abutments are situated upon opposite sides of the arch. Example: Supplying four anterior teeth, using the cuspids as abutments, or supplying the four incisors and the four bicuspids and first molars, using the cuspids and second molars as abutments or piers.



Cantilever Bridge.

bridges may exist, such as cases presenting anterior abutments upon both sides of the arch and posterior abutments on one side only. The practice of all bridgework must be subject to certain essentials, none of which may be overlooked without impairing the value of the fixture as an accessory to the health of the patient, and, broadly speaking, may be summed up as follows:

Essential Factors in Bridgework.

Fourth: A cantilever bridge is one which is attached to natural abutments at one end only, and depends upon the resilient mucosa for its major support. Combinations of complex and cantilever

First: The mechanical essentials of a bridge are abutments, attachments, saddle and artificial teeth.

Second: Macroscopic essentials of a bridge are the correct mesio-distal, bucco-lingual and gingivo-occlusal measurements of all the mechanical essentials

Third: The surgical essentials of a bridge are the extirpation of the pulps when necessity for this operation exists; the correct cleaning out and filling of the root-canals and the proper preparation of the pier teeth or the cavities within them.

Fourth: The physiological essentials of a bridge are the interplay of the surgical and mechanical essentials with the adjacent and subjacent tissue in such a manner as to facilitate the occurrence of intermittent pressure upon the subjacent resilient mucosa during mastication.

Fifth: The phonetic essentials of a bridge will be complied with when its form has been correctly produced, for only then will it play its part as a resonator, amplifier and articulator of sound.

Because dental bridgework usually and nearly always means an artificial fixture for the human mouth, it may be broadly defined as a dental operation.. Any dental operation may be correct or incorrect, and a correct dental operation may be defined as one, the result of which is conducive to the health of the individual upon whom the operation is performed. And we understand under the term "health" the maintenance of that vital balance which is expressed by the normal functioning of all organs which compose the human body.

The teeth are organs of incision, prehension, mastication, and as accessories of vocalization, speaking or singing, have these varied functions to perform. To be best suited for this task, Nature has caused them to acquire in the process of their development certain qualities and certain definite structural shapes. Any deviation from their macroscopic normality and their microscopic organization, causes a lack of functional efficiency and interferes with their normal contribution toward the main-

tenance of vital balance. Hence all dental efforts should be directed toward a re-creation of macro- and microscopic acceptableness of these organs when they require our attention at all.

**Importance of
Interplay of
Parts.**

In health, teeth, gums, in fact, all organs in the animal body, perform their function as a matter of grateful exercise without undue consciousness on the part of the animal, contributing to the maintenance of an efficient organization, in which the income is greater than the expenditure to obtain this income. But in order to obtain such a condition we must have perfect interplay of all organs making up the animal body, and the first requisite for perfect interplay is absolute lack of interference by one organ with any other one or more organs.

We have had our lecture in anatomy of the teeth, and we know what they look like, or we should know. We have had our lectures in physiology, and we know what the gums and adjoining structures look like in a healthy mouth; we have likewise been able to learn the beautiful lessons of occlusion. All these should have given us a picture of healthy conditions not easily erased. And it is this picture we must ever seek to re-create, and we cannot re-create it *en masse* unless we re-create it in spots in individual teeth and their surrounding gingivæ.

Let me call your attention to a remarkable realization which must come to all of us who would endeavor to obliterate the effects of human error upon the human system. Every molecule which makes up the human, or animal, or plant body, is in a state of constant rhythmic movement, which motion is in definite geometric relation to the motion of the molecules neighboring it, which warrants the conclusion that the molecules influence one another by their rhythmic movements to the point of causing corresponding geometric gyrations in each other.

This is, of course, not a matter of first causation, that is, not a matter of life inception, but rather a matter of life maintenance by virtue of the maintenance of the equilibrium.

If we conceive the animal as a delicate clock or watch for example we may obtain a concrete illustration of the inter-relation of all the organs. Let us assume that we are accelerating the minute hand of a clock by slowly rotating it to the right (take out your watch and make the example more concrete), we can readily understand that we shall by this act influence the entire mechanism to a more accelerated motion, and that this motion will be in definite relation to the intensity of the accelerator force, and that there will be a definite rhythmic and geometric relation between the motion of each separate piece of mechanism which makes up the whole of the clock.



If we now remove the influence of the accelerator force an immediate rhythmic and geometric adjustment takes place, and the hands of the clock proceed to travel at the original speed. This may be called a stimulating interference with the mechanism and results in a greater amount of work or activity being done in a given time than the apparatus was intended for. If we now place the hour hand at the numeral "9" and the minute hand at the numeral "3," and suspend a minute weight from the extremity of the hour hand, we shall have an inhibitory interference with the mechanism, resulting in a given amount of energy doing a smaller amount of work than the apparatus was intended for; the spring will uncoil or attempt to uncoil at the same ratio, but its effect upon the wheels, and through these upon the hands, will be less marked than before; again there will be a rhythmic and geometric readjustment between the various parts of the clock, and another readjustment to normal when the inhibitory interference is removed.

Up to a certain point these experiments may be repeated without impairing the inherent virility of the spring, but as soon as the point of impairment is reached, a rhythmic readjustment becomes impossible, a lack of perfect interplay manifests itself, resulting in a heedlessness of expression; the parts interfere with one another, and a great deal of energy is expended to bring about a result; work which is as unsatisfactory as it is unreliable.

**Mobility of
Natural
Teeth.**

For the purpose of elimination of mechanical shock to the nervous system during mastication, and for the purpose of enhancing the vibrating effect produced during vocalization, be it singing or speaking; also for the purpose of minimizing mechanical injury to the teeth themselves, the latter are held in their bony sockets through the intermediary agency of an elastic membrane, which is so disposed beneath and around them, as to fairly hold them suspended in a resilient cushion.

The elastic fibres composing the membrane disposes themselves longitudinally, diagonally, transversely and circularly around the teeth; they interlace with the periosteum and with the gum tissue, and thus, during the exercise of dental function they effect an increase of circulation into the surrounding parts, which constantly brings fresh nourishment to these tissues.

- The very structure of this elastic membrane and its peculiar function precludes the possibility of abundant blood supply and makes it a ready prey to inhibitory interference. Such inhibitory interference may be brought about by impaction of foods into what are known as interdental spaces, more by the accumulation of calcific material known as tartar.



either upon or around the neck of the tooth, or upon portions of the root. The impaction of foods into the interdental spaces may be caused by the malrelation of the adjoining teeth (malocclusion), or by the improper restoration of approximal surfaces of teeth calling for dental attention. An inhibitory interference may also be brought about by a break in the continuity of surface upon a tooth in the region mentioned. A tooth may be filled, inlayed or crowned and a portion of the filling material may have been left extending beyond the margin of the cavity, or the crown may extend away from the gingival circumference, exercising a pressure upon the surrounding gum tissue.

If pressure be exerted upon any one or two teeth in the mouth, the pressure will be transmitted to all the surrounding structures, and through them to all other teeth in the same mouth in a series of rhythmic waves or undulations of varying degrees changing the physical outline of the surrounding structures in every direction. Upon the cessation of the pressure a rhythmic and geometric readjustment will take place in these tissues and a return to a condition of comparative equilibristic rest obtains. Where there are no inhibitory interferences, that is, where the relation of the teeth is correct, as to position, condition and form, these pressure induced waves or undulations may take place *ad infinitum* with beneficial results, because under a correct condition, intermittent pressure is the essential stimulating interference inducing an increase of circulation, bringing with it a fresh supply of nutriment essential to life maintenance.

When inhibitory interferences are present, that is, when the relation of the teeth is not correct as to position, condition and form, each pressure exerted upon the teeth during mastication causes the same series of waves and undulations in the soft tissues surrounding them, but each wave or undulation causes these tissues to come in contact with injuring or bruising obstructions and the rhythm of recoil or readjustment is first interfered with and ultimately destroyed.

Food débris, overhanging fillings, ill-fitting crowns, incorrect bridges, fixed or removable, open cavities, calcerious or calcific and soft epithelial deposits, may all be classed as inhibitory interferences with the free and unhampered undulating and very essential excursions of the soft tissues surrounding the teeth. All of them produce states not conducive to the health of the individual, and are, therefore, incorrect dental conditions; and any dental operation which will entirely eliminate them will be an operation conducive to the health of the individual, and therefore a correct dental operation.

**Exercise of
Tissue Needful
to Health.**

All tissues must be exercised, or, rather, they must have the freedom to indulge in such exercise as they need, and all tissues of all organs need exercise to keep them from undergoing atrophic changes. Hence, anything which will interfere with the free and unhampered undulations of the gum tissue, by any means whatever, results in pathological conditions by bringing about, first, a lethargic state in the tissue; second, a diminution in vasso-motor actions, because of lack of restimulation; third, an accumulation of waste material in the cellular and intercellular substance resulting in a rapid death of cells; fourth, an atrophy or loss of tissue, resulting in a physical change, which makes it difficult to maintain a hygienic balance.

Besides serving as bacteriological breeding places, the usual kind of bridgework, which in the exercise of our vocation we have often been called upon to clean and which we must now condemn, serve also to rob the teeth acting as abutments and the surrounding gum tissue of every change of free and unhampered motion, and such work brings about all the deleterious consequences mentioned heretofore. It will be well for us to remember that in all cases where teeth have been lost, and where artificial substitutes in the shape of bridgework are to be resorted to, the rational thing to do is to make the mucous structure carry the stress. The abutments or natural teeth, which act as supports for the bridge, must simply serve to prevent the vertical displacement of it during mastication, and they must so interplay with the bridge that they (the abutments) will be effectually kept from migrating into fields other than their own. Outside of these two requirements, nothing more should be expected from them.

The bridge itself must during mastication gently and to a limited extent ride upon the alveolar ridge covered with the mucosa, and so be made to supply the intermittent stimulating interferences essential for the enhancement of fresh nutriment by virtue of the increased pressure-induced circulation to the end tissues.

Artificial restorations in the form of bridgework must be constructed so that they will not interfere with the maintenance of the hygienic balance essential to proper sanitation.

Wherever you find a crown, the circumference of which extends away from the gingival circumference of the tooth, you have discovered or uncovered an inhibitory interference with the maintenance of correct oral conditions. Any piece of bridgework presenting the possibilities of retaining food débris, or exercising an unequal pressure upon the alveolar ridge, or lacking in occlusal restoration, or lacking in anatomical acceptability, is an inhibitory interference with the maintenance of correct oral

conditions. The elimination of these inhibitory interferences and the substitution of proper restoration in the cases involved will, therefore, constitute operations conducive to the health of the individual, and so may be classed as correct dental operation.

Abutments and Attachments.

What has been said of bridgework as a whole applies, of course, to abutments and attachments in detail. Abutments may be broadly divided into posterior and anterior. One of the first essentials in construction of these piers is rational and radical root-work where the pulp is involved.

Time will not permit the treatment of this phase of the work, and we will be content to remember that if any root-canals are here referred to we will assume that they have been properly treated.

The sum total of anchorage, that is, the sum total of contact surface between post and surface of abutments with the root, must be at least one-third greater than that part of the abutment which is exposed to grinding or triturating stress.

This calls for a preparation of the root which

**Preparation
of Roots.** varies as the direction of stress which these teeth are called upon to resist.

The root end must present certain angles, and these angles vary in obliquity, inversely as the stress, that is, the greater the stress the less oblique the angle.

What has been said of the non-interference of the bridge as a whole applies most emphatically to the abutments. The continuity between the abutments and the root or tooth it rests upon must be left unbroken. Great care must be exercised not to encroach too deeply upon the sub-gingival area, and the impairment of the periodontal membrane must be carefully guarded against.

No post which in size is large enough to threaten

**Size and Shape
of Posts.** the integrity of the root should ever be used. If for any reason it becomes necessary to use a post longer than two-thirds of the root, the post should taper for the gingival half of its length, and be cylindrical for its occlusal half, and its occlusal half should be threaded.

Anterior abutments in removable bridgework

Abutments. consist either of a root cap and tube, a root floor and tube, a lingual inlay and tube, or an artificial crown carrying some slot or sleeve or post.

Posterior abutments in removable bridgework may consist of a telescope crown, or a shell crown may be used containing a keyed slot; or it may carry a tube or post either in a vertical or horizontal direction. Or the root of the posterior tooth may be prepared to receive an inlay,

which in turn may carry a post either in a depression formed upon the inlay occlusally, or it may carry a post attached to it in an upright position.

We must always remember that we expect these abutments to serve us in preventing vertical displacements of the bridge by their relation to the attachments which will engage them. That is, they must prevent any vertical displacement beyond the linear height presented by the displacement of the soft tissue during mastication, and that it would prove decidedly advantageous to so construct our abutments that they will engage our attachments in a manner which will admit of some latero-rotary play during exercise of usual functions. And finally any completed abutment must be so made that it will restore to the mouth a dental organ capable of exercising all natural functions: mastication, trituration, incision, prehension and vocalization.

In fixed bridgework the abutments may consist of inlays supplemented by posts as root anchors; posterior and anterior, of Darby crowns, the bases of which have been cast; anterior and posterior, of shell crowns made in accordance with a technique outlined by the writer some years ago in the ITEMS OF INTEREST, in an article called "*The Metallic Molar Crown*."

The same general rules which apply to the abutments for removable work hold good here, and the necessity for contact surface between the abutments and the tooth or root carrying it is greater in fixed than in removable work.

The reason for this is simple enough when we remember that the principle involved in removable work is always that of the pontoon bridge, while that involved in fixed work is always that of the arch, span and suspension. A pontoon bridge is one which is supported through its entire length upon a yielding cushion, while a fixed bridge is one in which two or more piers carry a span of a certain length.

Exceptions may be taken to this latter definition, and it may be urged that some construct their fixed work so that there is a definite point of support for each artificial tooth, making up the span, which support they obtain by scraping the model, so that the artificial tooth is fairly buried in the mucosa, and the answer to this would be, first, that such action is against all principles underlying the maintenance of nutrition in the end tissues, and that no matter how harmless the result may seem to be, it is at best tolerated by the tissues and constitutes a condition not conducive to the health of the individual. It tends permanently to displace tissue from its proper environment usurping the location for itself in a spirit



of unfriendly conquest which nature always resents and ultimately punishes us for.

The occlusion in abutments for fixed or removable work requires the very minutest attention, and the veriest ideal in occlusal restoration must be striven for if we seek permanence of work. Reference is here made to the final requirements of abutments, that is, all abutments must be so made that they will restore to the mouth a dental organ capable of exercising all normal functions: mastication, trituration, incision, prehension and vocalization.

Attachments are the intermediary agencies which

Attachments. link the artificial restoration known as bridgework to the abutments. They are made a movable or fixed part of the bridge, as the case may require, which requirement will be made clear from a consideration of the study models and an exposition of direction of stress to which the abutments and the bridge will be subjected. Wherever possible, it is best to have the attachment form the male portion of an appliance, which will be completed when this portion is inserted into a corresponding female part existing in the abutment.

The one essential fact to remember in the construction of abutments is that they must definitely and frictionally engage whatever space exists for them in the abutments, any latero-rotary play being provided by semi-tubular spring or claw construction, or by the provisions of an arc or sufficient curve to take into account the amount of soft tissue displacement during mastication.

If a box and friction plate be used, the box must be placed into the abutment and must run as nearly bucco-lingually as possible; its shape must be that of the rectangle; the friction plate attachment is joined to the bridge, and it is so filed gingivally that it presents an arc, to which the perfectly straight floor upon the gingival part of the box shall be tangent. The sides of the friction plates are filed in the same manner. We thus produce three straight lines tangent to three curves.

Importance of Perfect Parallelism. The parallelism of the two attachments and abutments will enable the bridge to yield in a vertical direction under stress, while the curve upon as many sides of the friction plate will provide a lateral yield.

A summation of the yield provided, plus the resiliency of the gum tissues will result in the latero-rotary yield essential to all simulation of natural tooth movement.

We have mentioned the parallelism of the abutments and attachments, and we will realize that they are the essential mechanical requirements

of a bridge. If the bridge is to be a fixed appliance, the abutments must be parallel, because we must be enabled to cement the bridge into position without exercising any pathological stress upon the pier teeth.

If the bridge is removable, abutments must be parallel, so that the parallel attachments may engage them frictionally and easily, and so that the appliances may ride gently and to a limited extent upon the mucosa during mastication.

In order to obtain such parallelism, certain instruments called a parallelometer and parallelodrill, respectively, were designed.

*The essential in the mechanical construction of any bridge is that it shall go into the edentulous space for which it is intended, without exercising any stresses whatever upon the teeth or roots acting as piers or abutments.**

In a fixed bridge, this means that the abutments, whatever they may be, must be absolutely parallel.

In a removable bridge it means that the abutments or piers must be parallel to each other, and that the attachments which are to engage the abutments must be absolutely parallel to the abutments.

The word "absolutely" is used, not in any relative sense, but in the real sense of its meaning.

Any abutment which during insertion or removal of a piece of bridgework is subjected to stress is a doomed member of the patient's dental equipment, unless the condition is obliterated by rectifying the error.

Parallelism of abutments is therefore the relative determinator of the mechanical success of a piece of fixed or removable bridgework.

The smaller the span to be bridged, the more perfect must be the parallelism of abutments and attachments.

The parallelism of abutments should be inversely proportioned to the distance of the abutments from one another.

A deviation from the parallel must be unappreciable to the sense of sight or touch, no matter what the distance between the abutments.

The dental parallelometer is an instrument for carrying, placing and taking impressions of attachments for fixed and removable bridgework at various distances, measured in micro-millimeter terms and insuring the juxtaposition of these attachments to the respective abutments in equi-distant relation to each other.

It consists of two rectangular metallic sections (Fig. 1, A and B), and an actuating screw (Fig. 1, C), which engaging the section B and held down to the section A at the point of intersection of line A and B, C and D,

*Italicized by the Editor.

Items of Interest

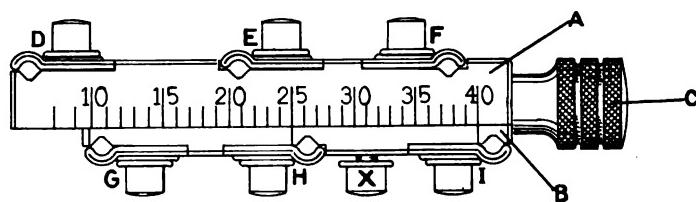


Fig. 1.

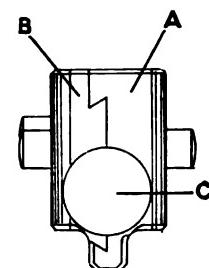
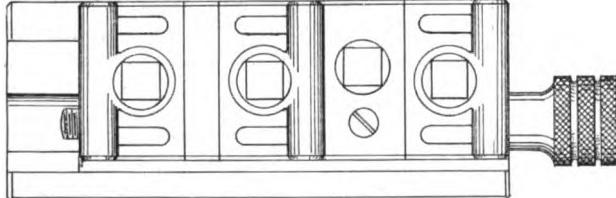


Fig. 2.

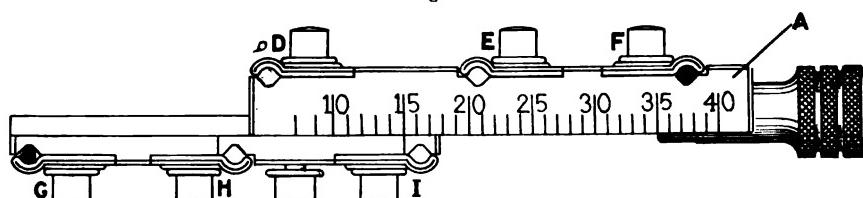


Fig. 3.

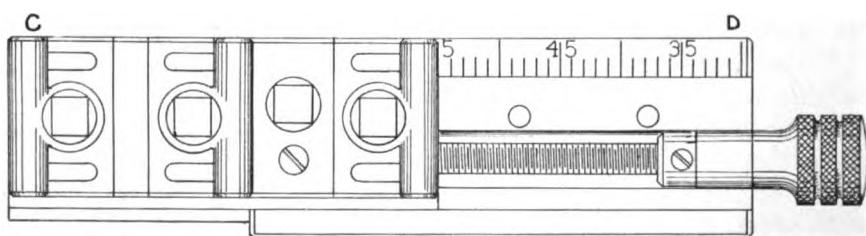


Fig. 4.

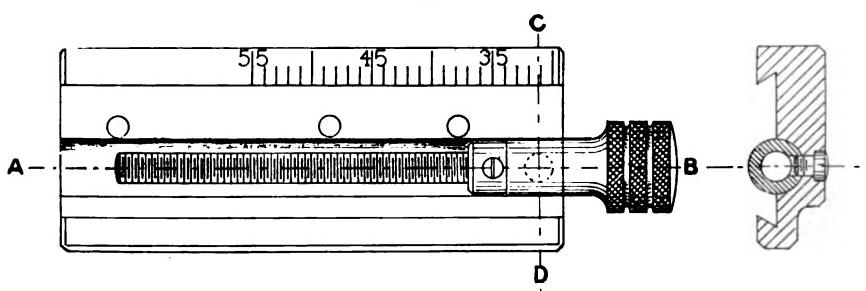


Fig. 5.

Fig. 5, will, when turned, cause a change in linear adjustment between A and B, Fig. 1.

Each metallic section carries 3 clamps, D, E, F, G, H, I, for holding in place the various mandrels used for carrying the different attachments which a specific case may require, Figs. 1 and 3.

The body of the instrument is 40 mm. long. Its linear dimension may be increased to 55 mm.

The upper surface of section A, Fig. 3, is graduated in mm. from 1-40, the graduation being continued upon the engaging surface of the same section from 35-55 mm., Figs. 4 and 5.

Fig. 6 is an end view of the engaging sections and shows the positive resistance to any deviation from a perfect horizontal.

Fig. 7 shows the parallelorometer with five of the clamps in action, illustrating the peculiar system of measurement which enables us to obtain a constantly decreasing unit of measure by constantly increasing number of turns of the screw.

When the abutments of a bridge are more than 25 mm. and less than 40 mm. apart, clamp D, upon section A (Fig. 7), shall be the unit point, and clamp I, upon section B, shall be the movable point at which the mandril for the required attachments shall be held.

When the abutments of a bridge are more than 10 mm. and less than 25 mm. apart, clamp D, upon section A, shall be the unit point, and clamp H, upon section B, shall be the movable point for holding the required mandrels.

When the abutments of a bridge are more than 7 mm. or less than 10 mm. apart, clamp D, upon section A, shall be the unit point, and clamp G, upon section B, shall be the movable point for holding the required mandrels.

When any two points more than 40 mm. and less than 55 mm. apart are to be paralleled for attachments, clamp F, upon section A, is to be used as the unit point, and clamp G, upon section A, is to be used as the movable point for holding the required mandrels.

X, Y, Z, is a right triangle, of which X, Z, is the hypotenuse and Y, Z, the base.

Base Y, Z, carrying mandrels, and being the movable section, is bringing these mandrels nearer to or further away from the mandril held at unit point clamp D, at apex of the hypotenuse. It must be seen that here we have X, Z, hypotenuse being measured in terms Y, Z, base.

The more closely G, H, I, approaches clamp D, the more number of turns of the actuating screw, C, will it require to complete a mm. distance. Hence we have a constantly increasing number of micro mm.

Items of Interest

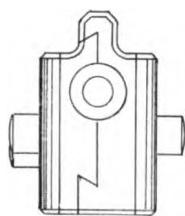


Fig. 6.

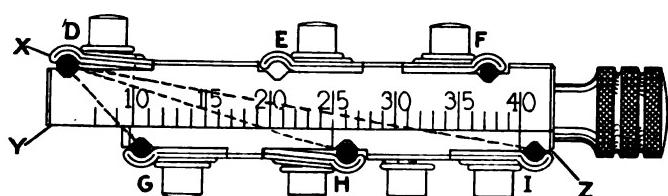
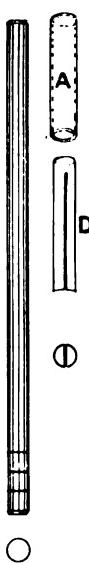


Fig. 7.



D

A



E

B



F

C

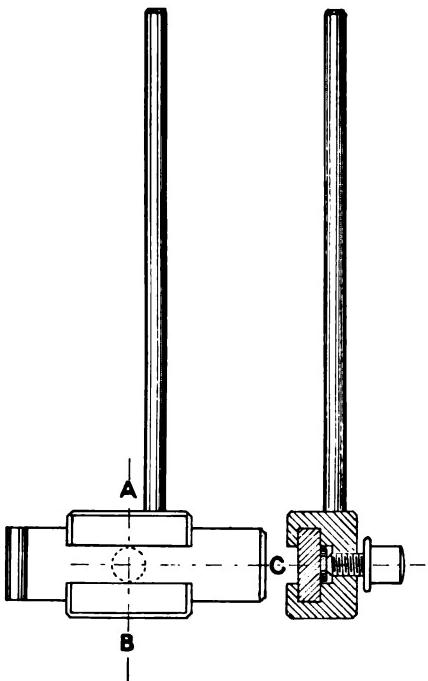


Fig. 9.

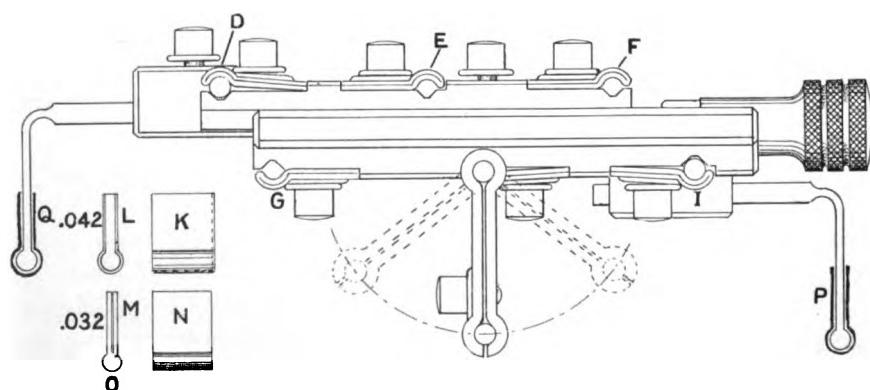


Fig. 10.

divisions to each mm. as the distance between bridge abutments decreases.

Fig. 8 presents three mandrels, 13-14 and 15 gauge (Brown & Sharp). They are used for carrying platinum tubes, A, B, C, of corresponding diameters, the walls of these tubes are .007 of an inch in thickness.

These mandrels are locked into the body of the parallelometer, one on each section, into clamp D, on section A, and into clamp G, H, I, as the case may call for on section B.

They are always perpendicular to the horizontal plane of the meter, and the tubes placed upon these mandrels will therefore be parallel to each other.

As the actuating screw, C, is turned forward or backward, the distance between these mandrels will be decreased or increased, as the case may be.

Split pins, rendered somewhat elliptical in form, made of iridio-platinum or highly platinized clasp metal and of corresponding diameters, frictionally engage the platinum tubes and form the retentive part of what is known as the split pin and tube attachment (Fig. 8, D. E. F), used on upper cuspids and centrals and lower cuspids.

Fig. 9 shows the mandril to be held in the parallelometer for carrying an attachment used on posterior teeth.

By virtue of its construction, as seen at A, B and C, it is capable of adjustment in horizontal, vertical and circular directions.

Fig. 10 shows the parallelometer holding two of these mandrels, one in clamp D, section A, and one in clamp I, section B.

It also shows a top and side view of the platinum hood, K and L. The outside measurements of its width is .042 of an inch, and a top and side view of the plate, or male part of the attachment, M and N. The outside measurements of its width is .032 of an inch.

The male part of this attachment is made of two plates of highly platinized clasp metal, keyed at the distal end, O, and is the part of the attachment which is affixed to the bridge, while the hood portion is placed into the crown or an inlay to be cemented onto or into the tooth acting as the abutment.

P and Q show the manner of slipping the platinum hoods over the mandrels and carrying them into parallel relation to each other, and placing them into the abutments in such relation.

Fig. 11 shows at A and B, and C and D, the mandrels for carrying what is known as the bucco-lingual attachment, A and B for molars and C and D for bicuspids.

When there is no pulp involvement of any kind in the teeth which are to be used as piers for a bridge, these bucco-lingual attachments may be used with perfect safety without resorting to pulp extirpation. In

Items of Interest

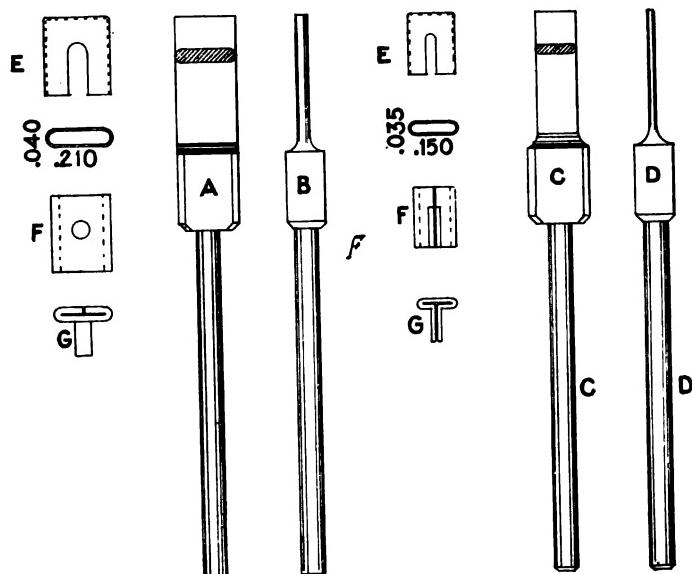


Fig. 11.

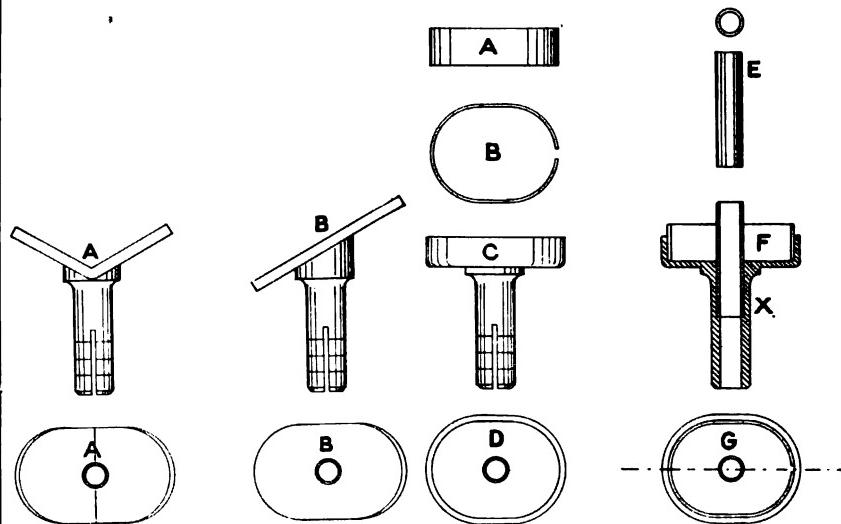


Fig. 12.

Fig. 13.



such cases, cavities are prepared in these teeth and inlays are made for these cavities, and it is onto these inlays that the female parts of these bucco-lingual attachments are secured.

The attachment is .210 wide and .040 of an inch thick for molars. .150 of an inch wide and .035 of an inch thick for bicuspids and varies in depth as the linear height of that tooth gingivo-occlusally which is to carry the crown or inlay when it becomes the abutment for a bridge. The attachment consists of a female part or platinum box.

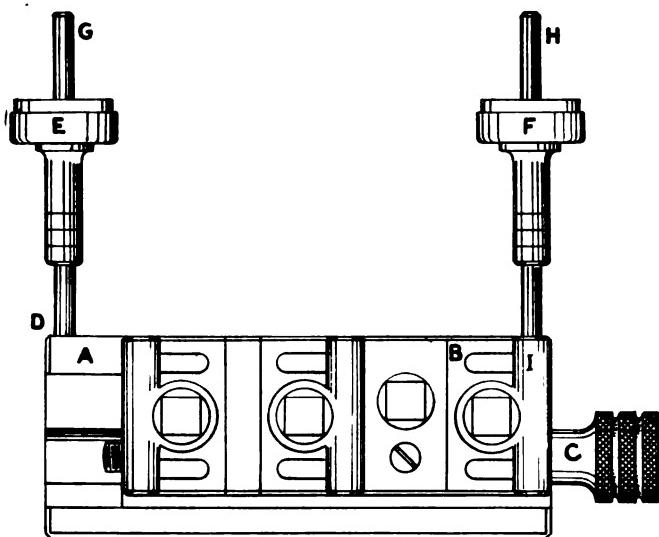


Fig. 14.

E, E, this is slipped onto the mandril, held in the paralleloometer and carried to its position upon the model for the bridge; a male part consisting of a double plate of highly platinized clasp metal, F, F, which fits into the platinum box and which plate is to form a part of the bridge.

F, F, are mechanical drawings of the male portions of the large and small attachments; G, G, are cross sectional views of them.

Upon completion of the bridge, the lingual, buccal and gingival sides of the male parts are filed to produce an arc of varying degree, the extent of the arc to be determined by the condition of the underlying mucosa. Each one of these sides will touch the straight sides of the box or female part at one point only. We shall thus have an arc tangent to a straight line, which arc will be brought into activity whenever the bridge will be subjected to any lateral stress.

Figs. 12 and 13 show a series of impression trays for co-acting with

the mandrels shown in Fig. 8. A in Fig. 12 is a tray used to obtain a Taggart wax impression of a root-end.

The tray, made in as many sizes as the number of straight mandrels provided with the paralleloometer, is slipped over the mandril and will frictionally engage any part of the mandril it may be at. The platinum tube is then slipped upon the mandril. The tray is brought up to meet the tube, which will enter part way into the friction sleeve.

Taggart wax is then placed directly upon the tray and around the tube. The mandrels, carrying tray, wax and tube, held in the parallelo-

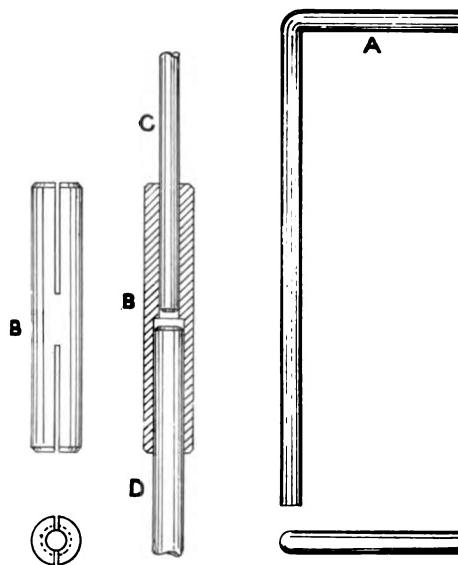


Fig. 15.

meter, are now placed into the roots, and the trays are forced up so as to bring the wax into the countersunk root-canal and onto the root surface.

B, in Fig. 12, shows a tray used in like manner for obtaining a wax model of a lingual cavity in an anterior tooth, so that a lingual inlay carrying a platinum tube may be constructed.

Fig. 13 presents views of frictional impression cups, which fit over the straight mandrels and serve for taking impressions in plaster or compound, of root-caps on anterior roots and platinum tubes in proper relation to each other. A is a view of the split band which forms an inner removable collar in the cup. B is a cross section of this band. C shows the cup and friction sleeve. D, the enlarged part of the friction sleeve, which is to be partly occupied by the platinum tube. E shows the platinum tube before it slips into the friction sleeve. F is a cross section of

cups, removable collar and platinum tube stopped at a definite shoulder within the sleeve. G shows the various members, cup, collar, sleeve and platinum tube concentrically arranged. Fig. 14 shows the parallelorometer holding one mandril at clamp D, section A, and another mandril at clamp I, section B.



Fig. 16.



Fig. 17.

Assuming that the canals in two cusps have been made parallel, in a manner to be subsequently described, and assuming that two root-caps have been properly made for the two cusp roots, two friction impression cups are slipped over the mandrils to be followed by two platinum tubes, G and H.

A thin mix of plaster is placed into each cup, and the instrument, carrying mandrils, cups, plaster and tubes, is now so placed into the mouth that the tubes upon the mandrils will enter through the perforated floor of the root-caps upon the roots and slip up into the canals.

The cups are now brought up toward the roots and an impression is obtained of root caps and platinum tubes in proper parallel relation to each other.

When the impression material has set, the paralleloometer is removed from the mouth and with it in the little friction cups will come the platinum tubes and root caps.



Fig. 18.

A mix of refractory compound is made, and with a small brush it is painted into the root caps and around the tubes until a mound of sufficient size has been built up.

When this compound has set, clamps D and I are opened and the body of the instrument is removed, leaving the mandrels, cups and removable collars still with the root caps and tubes imbedded in plaster and refractory material.

The mandrels are carefully turned and brought out.

The cups are pried off and the removable collar will spring apart. The plaster which surrounds the root caps and tube is now in full view.

Graphite points, equal in size to the mandrels which have been used, are now inserted into the platinum tubes, and these are joined to the root caps with 22 or 20 K solder.

The soldered caps and tubes are now cooled, cleansed, filed and polished.

The mandrels are reclamped into the parallelometer at clamps D and I, respectively.

The platinum tubes and root caps are now mounted upon the mandrels and are to be cemented, one at a time, in a manner to be outlined in detail in subsequent articles, covering specific cases.

If the technique is followed out as directed, it must be apparent that the tubes carrying caps will be perfectly parallel to each other.

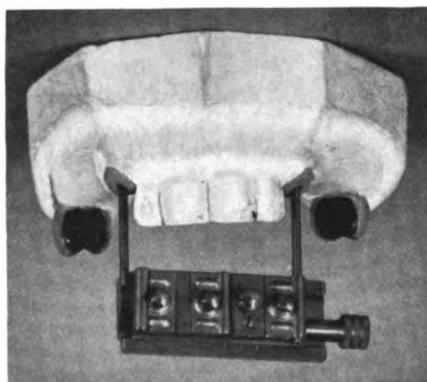


Fig. 19.

Fig. 15 presents at A the view of an angle mandril to be used in the parallelometer, for placing buccal tubes upon anchor bands in orthodontia cases in such manner that the expansion or retaining arch may be slipped into position without binding at these points.

B and B, C, D, shows an auxiliary friction tube in the act of engaging a mandril at C and a clasp metal post at D.

The mandril C would be held in the parallelometer at the clamp any particular case may call for. Another mandril would be held in another clamp of the meter, upon the other section, A and B, as the case may be. The post D may then be deposited at whatever place it is called for upon the crown or inlay and waxed thereto in perfect parallelism to the other mandril.

The clamps may then be opened and the meter removed. The mandril, C, and auxiliary tube, B, are now slipped off from the clasp metal post, D.

The crown or inlay to which it is waxed may now be imbedded in refractory material and the post and crown or inlay may be joined with solder.

Fig. 16 shows the parallelodrill, with drill heads **Parallelodrill.** — 7 mm. apart.

The parallelodrill is a dental engine accessory which co-operates with the parallelometer in such a manner that any linear variation from 7-35 mm. may be transferred from the parallelometer to the parallelodrill.

The latter is then slipped onto the handpiece of the engine, the drills or reamers are inserted, and the root canals, which are to be paralleled to one another, may be reamed out at the same time.

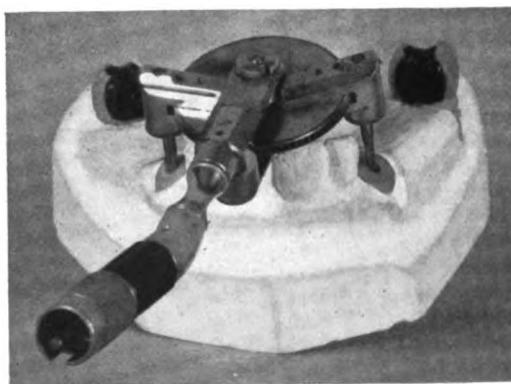


Fig. 20.

Let us assume that we wish to parallel two cuspid roots, and that the ends of the roots have been properly filled.

Two mandrels, as shown in Fig. 8, either 13 or 14 gauge (Brown & Sharpe), as the case may require, are now clamped into clamp D, on section A, and clamp I, on section B, respectively, Fig. 1. The actuating screw, C, Fig. 1, is now turned toward the operator, when section B is held innermost.

The mandril at I, Fig. 1, will gradually and with constantly diminishing speed approach the mandril at D.

From time to time the two mandrels held in the instrument are brought up to the root canals of the teeth to be used as piers.

When the distance between the two mandrels is equal to the distance between the orifices of the two root canals, so that the mandrels will just enter or be caught in the orifices, the parallelometer is locked by means of a key provided at X, Fig. 1.

The mandrels are now unclamped and two short studs are placed and clamped into the parallelometer in their stead.

The two heads of the parallelodrill are now spread apart so that they will slip over and onto the two pyramidal-shaped studs.



The studs will fully engage the two spaces provided in the heads of the drill so that no variation in linear distance is possible.

At this time the distance between the two drill heads of the parallelo-drill is fixed by a locking device provided at the centre of the large gear.

The studs are unclamped from the parallelo-meter and then removed from the drill heads.

Two twist drills, as much larger in diameter than the mandrels as are the platinum tubes, are now inserted into the drill heads; the parallelo-drill is slipped onto the engine handpiece, the power is turned on and the twist drills are allowed to work their way into the canals of the two cuspid teeth to be used as piers.

In this manner both canals are reamed out to the size required, and they will be parallel each to the other. The minimum amount of tooth structure is sacrificed and the physical integrity of the roots is never made doubtful.

Fig. 17 shows the parallelo-drill with heads set at an angle of 90 degrees for the purpose of drilling or grinding into two teeth at once. In this position it may be used on the right lower or left upper jaw. The large gear will effectually hold the tongue out of the way.

Fig. 18 shows the parallelo-drill with drill heads 35 mm. apart.

Fig. 19 shows the parallelo-meter holding the mandrels at the orifice of two cuspid roots.

Fig. 20 shows the parallelo-drill holding a twist drill in each head, the twist drill having entered the two roots.





A Consideration of the Question of Early Treatment of Malocclusion.

By FREDERICK C. KEMPLE, New York.

*Read before the Meeting of the American Society of Orthodontists, Toronto,
July, 1914.*

During the past ten years the question of the proper time to begin the treatment of malocclusion has received attention and discussion mainly, if not entirely, from but one viewpoint, *i. e.*, that favorable to so-called "early treatment." During this decade the orthodontist has both preached and practiced "early treatment"; appliances have been placed on the teeth and the operation for correcting malocclusion begun at what he considered the "first manifestation of malposition" of the teeth.

Prior to this decade, during which the propaganda for early treatment has become so strong there was a period in which parents were instructed to wait until the child had all of the permanent teeth (except third molars) fully erupted. Some text-books gave the interval between the ages of twelve and eighteen years as the most favorable time for treating these deformities. During the present crusade for early treatment, cases are recorded in which this work was started for babies as young as two and a half years of age. Thus, within the short span of a few years, orthodontia, on the question of "proper time for treatment," has gone from one extreme to the opposite; from the adult, as the proper time to begin treatment, almost to the infant in arms.

In the opinion of the writer, this propaganda for early treatment, in the large majority of cases, is just as extreme and just as radically wrong as the previous theory for delay was erroneous and injurious. In the present paper it is my purpose to consider the question of "proper time

for beginning treatment" from a standpoint intermediate between these two extremes. I do not wish to place myself on record as being opposed to all early treatment—I have some patients as young as four and five years of age—but I do wish to express an emphatic and absolute opposition to *unnecessary treatment*, and also to *unnecessarily prolonged treatment* for young patients, and by "young patients" I mean children under eight or nine years of age.

There can be no fixed rule for the time to begin treatment made which will be a safe guide to follow in all, or even in the majority of cases. Conservative judgment, born of careful observation and experience, must always be the safest foundation upon which to base our decisions.

**Arguments
in Favor of
Early Treatment.**

The reasons for delay which were given a few years ago have been so completely exploded that it is unnecessary to even touch upon them in this discussion. Also the arguments adduced in support of the early treatment propaganda are quite familiar to all of us and need only be mentioned, viz., "the ease with which teeth are moved in early life," "growth and repair most rapid at this time," "stimulating development," "aiding Nature," "guiding erupting teeth," "inducing bone growth," "increasing the width of the nasal spaces," "insuring greater regularity in size and position of the antra and of all the other sinuses of the face," etc., etc. It has even been stated in a recently published paper that the size and shape of the sella turcica, the seat of the pituitary body, may be changed by widening the upper dental arch.

Many of these arguments are of insignificant importance. For example: We can move teeth almost as easily at ten years of age as we can at six—there is not enough difference in the amount of pressure required at the two ages to be worth a moment's consideration; and the rate of growth and repair at ten years of age may be as rapid as at any earlier age so far as we are able to judge—at least the rate of growth and repair at ten is sufficiently rapid for orthodontic purposes. Also in our zeal to "aid Nature" we may rush to her assistance in many of these cases at a time when she would be much better off without our ministrations.

There are some of these arguments, however, if supported by acceptable clinical evidence, that would be very good and sufficient reasons for beginning our treatment at almost any early age; the earlier, probably, the better. But, unfortunately, the more important in this catalogue of reasons are but bare assertions; they are statements of what we would *like* to believe *might* take place, but they are not supported by adequate clinical facts. They are purely presumptive. For example: We do

not know that the bony structures which underlie the alveolar process are stimulated to any greater or better development through orthodontic measures than they would be without it; it has not been shown in any definite manner whatsoever that gentle pressure on the teeth at an early age, or at any age, will cause an increased growth of bone beyond the immediate region of the alveolar process.

Nor have we been able to demonstrate that the width of the nasal spaces can be increased in the slightest degree by even the most extensive widening of the upper dental arch.

Also there is not an atom of demonstrable evidence to indicate that early treatment will in any manner affect the size or position or shape of the antra or of any of the other sinuses of the face. Statements to the contrary are presumptive, and are founded on hypothetical reasoning, and not on observed facts.

If the form or structure of the maxillæ or mandible can be changed by changing the position of the teeth, we might naturally assume that the general shape and contour of these bones, in cases wherein the teeth have not been disturbed by artificial movement, would bear some definite relation to the contour of the dental arches. An examination of a number of skulls, however, will hardly bear out this assumption. Narrow, constricted and crowded dental arches may be frequently found perched upon well-developed mandibles—and frequently the upper anterior teeth are decidedly prominent in relation to the maxillæ proper, which conditions certainly indicate that there is not a definite and fixed relation existing between the two.

It is true that well-formed facial bones usually accompany normal, well-developed dental arches, but this does not signify that the degree of development of these bones is necessarily dependent upon the form of the dental arches. It might rather indicate that the same forces working for normal growth were active in both parts.

**Relation of
Dental Arch
to Basal Space.**

Also, if the width of the nasal spaces is increased in conformity to the degree of expansion produced in the upper dental arch in treating mal-occlusion, it would be reasonable to expect all normally wide dental arches to be accompanied by relatively wide nasal spaces; and, conversely, narrow upper dental arches to be associated only with narrow nasal spaces. But the direct reverse of this relation is frequently found to exist. I recently examined a few skulls from Dr. M. H. Cryer's collection, and among this small number there were four in which the upper arches and nares measured as follows:

Skull 1. Measured from the mesio-buccal cusp of the second molar across the arch to the mesio-buccal cusp of the opposite second molar 2.13 inches. The nasal space in the same line measured 1.52 inches.

Skull 2. Measured from the mesio-buccal cusp to the second molar

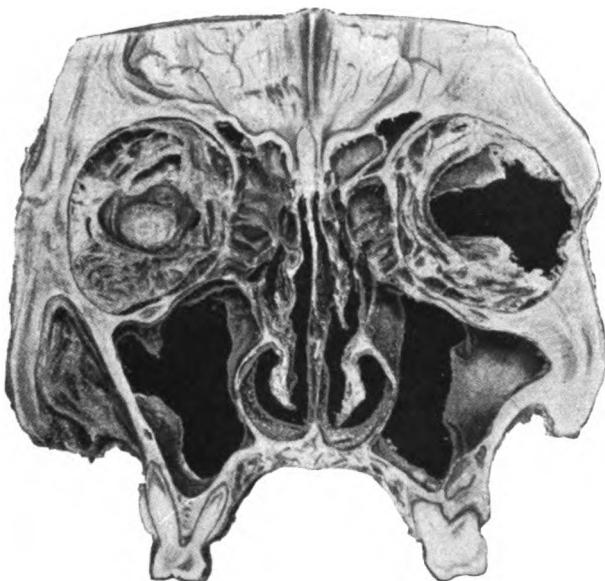


Fig. 1.

Fig. 1 is made from a skull with a very wide arch and a narrow compressed nose. The outside measurement of the arch is 66 mm. The nose should be 35 mm. but is only 20 mm. It will be noticed that the maxillary sinuses are very large, which is usually the case where the nose is so narrow. When the nose is wide the antra are often small, or may even be undeveloped. (Cryer.)

across the arch to the mesio-buccal cusp of the opposite second molar, 2.58 inches. The nasal space in the same line measured 1.34 inches.

Skull 3. Measured from the mesio-buccal cusp of the first molar across the arch to the mesio-buccal cusp of the opposite first molar, 1.76 inches. The nasal space in the same line measured 1.42 inches.

Skull 4. Measured from the mesio-buccal cusp of the first molar across the arch to the mesio-buccal cusp of the opposite first molar, 2.36 inches. The nasal space in the same line measured 1.31 inches.

In No. 1 and No. 2 the measurement was from the second molar across the arch to the opposite second molar. In this region the arch of No. 2 was .45 in. wider than in No. 1, while the nares of No. 1 was .18 in. wider than in No. 2.

In No. 3 and No. 4 the measurement was from the first molar across the arch. In this region the arch of No. 4 was .60 in. wider than in No. 3, while in No. 3 the nares was .11 in. wider than in No. 4.

These are examples of wide dental arches being accompanied by narrow nasal spaces; and of narrow dental arches accompanied by wide nasal spaces. In speaking with Dr. Cryer about this condition, he



Fig. 2.

Fig. 2 is made from a skull showing one of the narrowest arches in my collection. The width of the arch across the outside of the second premolars is but 44 mm., while the floor of the nose measures 35 mm., one of the widest I have at this point of measurement. (Cryer.)

expressed the opinion that the width of the nasal spaces probably is governed more by the size of the antra than by the width of the dental arch. In an excellent paper read before this society, in Chicago, in July, 1912, Dr. Cryer called attention to this non-conformity in size of dental arch and nasal space, and showed pictures of several skulls illustrating the lack of definite relation in these two regions. Two of the illustrations used by him at that time are here reproduced in Figs. 1 and 2.

At the request of Dr. Kemple, the following report of a case from practice is appended. Patient was referred by one of the most prominent rhinologists with the following statement:



Fig. C. (Radiograph by Schamberg.)

Radiograph showing condition in living patient similar to those shown by Cryer in the skull seen in Fig. 1. Very wide arches with exceedingly narrow nasal space. For proper comparison remember that this radiograph is not reduced while Cryer's figure is about half size.

"This boy has the narrowest nasal spaces that I have seen. Would it be possible to increase his capacity for nasal breathing by widening his dental arches?"

An examination disclosed exceedingly wide, well-formed dental arches, which if anything were over-wide, as spaces existed between several teeth in both arches.

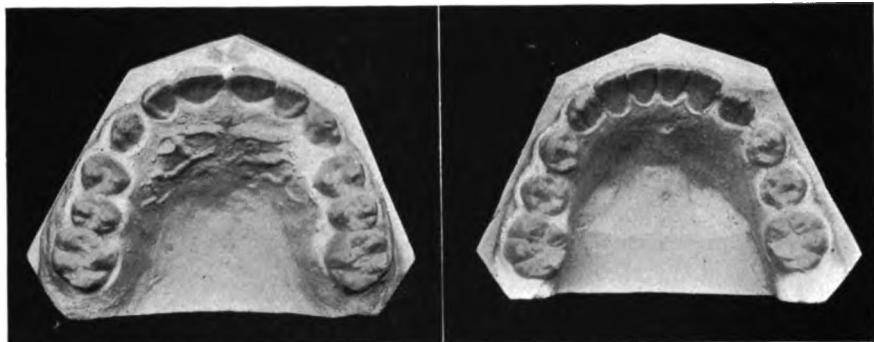


Fig. A.

Fig. B.

Figs. a and b show occlusal views of the upper and lower casts.

Fig. c is from a radiograph taken through the skull and shows the comparative width of the nasal spaces and the dental arches. The radiograph is interesting for comparison with Dr. Cryer's sections of skulls, because here we have disclosed a condition as it existed in life.

R. OTTOLENGUI.

Also, in listening to these witching arguments that we should aid Nature at the very earliest opportunity, many of us are likely to lose sight of one of the most important facts in biology, viz., that *Nature is constantly making an unremitting effort to overcome her own defects*. Another important fact that should be kept in mind before embracing the "early treatment" doctrine, as a rule for all cases, is, that we have not yet arrived at that degree of skill in diagnosis of malocclusion where we can always be able to say with nicety just what is normal and what is abnormal in deciduous and mixed dentures. These are important facts, and are worthy of serious and conservative investigation before attempting to sweep them aside by any course of inductive or deducative reasoning.

**Possibilities
of Development.**

In viewing early treatment by this light I am not detracting one jot or tittle from the true value of orthodontia as an important element in the healing art, nor from the value of early treatment when its need is really indicated. The real worth of orthodontia as a factor in the physical and mental development of the child has been amply demonstrated. Its benefits to hundreds of children are evidenced on every hand. But, like every good thing, orthodontia, in my opinion, is being overdone through this inordinate propensity for early treatment. I sincerely believe that a large percentage of the cases that are now being treated at five and six and seven years of age would need no treatment whatever if the beginning of the operation were deferred until the child had reached the ages of nine or ten years. I claim for orthodontia all credit that rightfully belongs to her, but I also wish to give Nature a fair chance to do her work in her own mysterious way.

In the discussion of a paper read before this society a few years ago, Dr. L. S. Lourie, of Chicago, expressed himself as follows:

**Dr. Lourie's
Views.** "I think we will have to change our mode of observation before we can determine what is the normal width and size of the arch at various ages.

. . . . I do not feel that I am justified in expanding deciduous arches to make them the width that the permanent arch is going to be. I frequently notice that the bicuspids and cuspids are developing in the process quite a bit buccally to the position of the deciduous arches, and I do not see the object of disturbing the deciduous arches for the purpose of causing the bicuspids and cuspids to come in buccally, as they will do anyway in a large percentage of cases."

Last year at Chicago Dr. Dewey, in his discussion of Dr. Young's paper, used this language:

**Dr. Dewey's
Views.** "Because you do not find spaces between the deciduous teeth at six is no proof that they will not be there at six and a half years of age. Individuals develop at different ages. A condition at the age of six may be normal for that individual, and in the next youngster at six and a half a similar condition would be normal for that age."

Dr. Dewey could have extended the time six months at each end, making the range a year and a half instead of six months, and he would still have been well within the realm of fact.

If there happens to be a marked insufficiency of space for the permanent incisors, even when these teeth come through the gum, it is not proof that there will not be sufficient development to accommodate them in proper alignment and position by the time they are fully erupted.

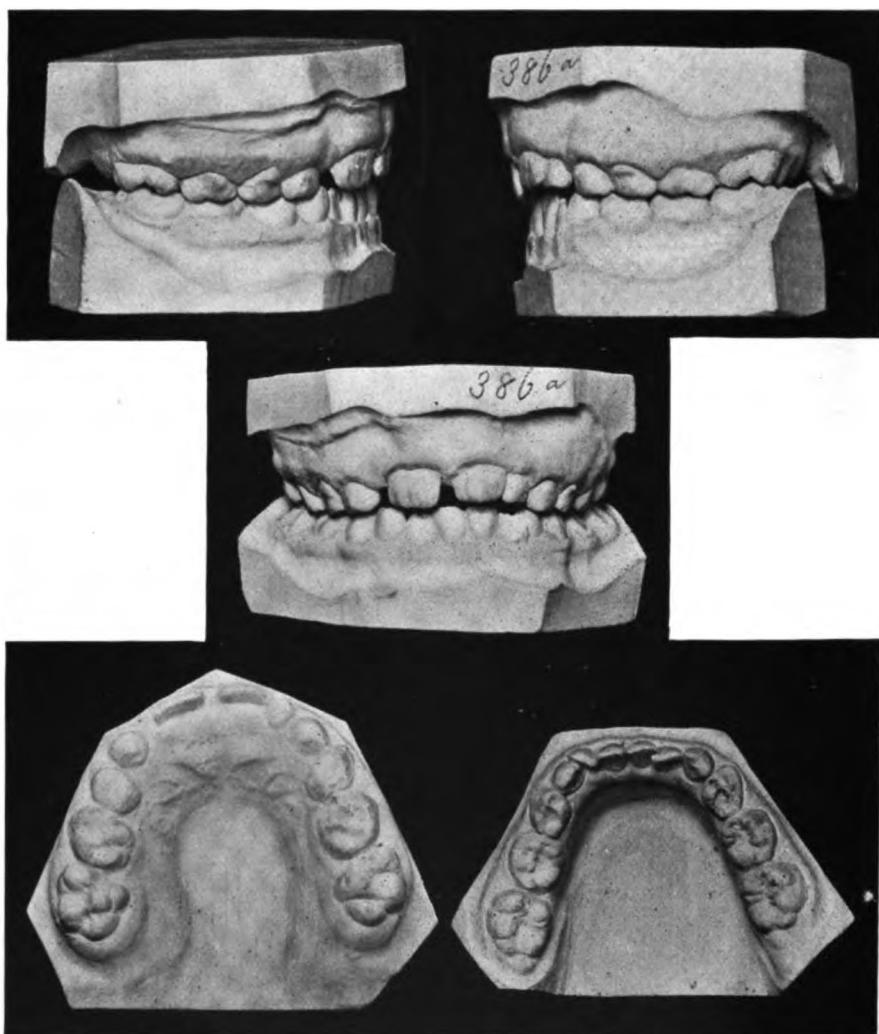


Fig. 8.

Every dentist of experience has observed incisors "straightening themselves." In one of the early editions of Dr. Angle's work he gives this bit of wholesome advice:

Angle's Advice. "Studiously avoid needless interference in those cases where it is apparent that Nature will, unaided, correct the deformity; but take professional pride in encounters with the interlocked, twisted and over-

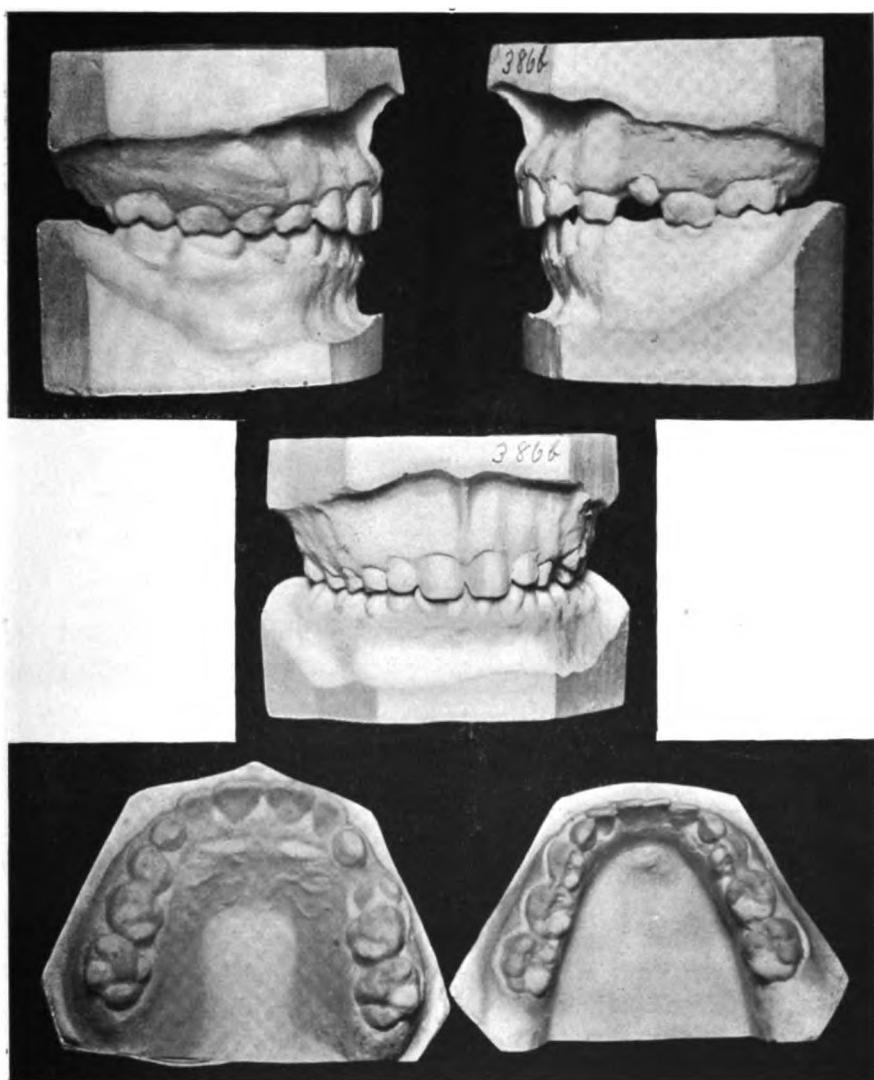


Fig. 4.

lapped, or otherwise malposed teeth, which usually become worse and complicate the condition of the teeth yet to be erupted."

These were golden words, and are worthy of a place over the working cabinet of every orthodontist. But, unfortunately for all students of orthodontia, and particularly for the young orthodontist, these invaluable words of caution and warning have been, either studiously or inadvertently, omitted from all later editions of this work.

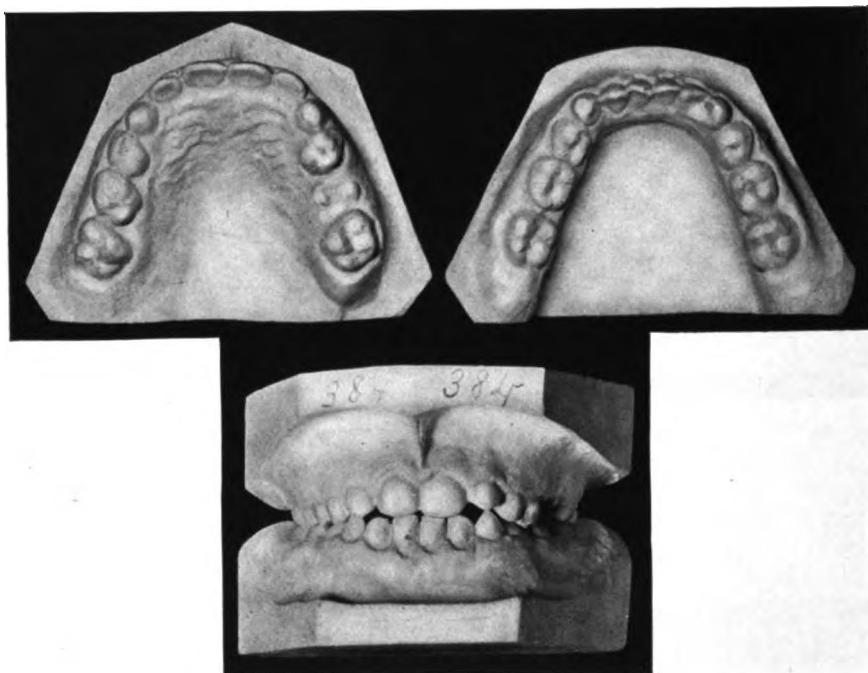


Fig. 5.

**Study of
Early
Malocclusions.**

There are many cases in which the malocclusion in very young children is more apparent than real, and in which the natural tongue and lip pressure are often as effective in correcting the doubtful deformity as would be the expansion arch, ligatures, etc. The forces of normal tongue and lip pressure, which are constantly active, will often bring malposed erupting teeth into alignment and proper occlusion. This is particularly true of cases where the lower permanent incisors may be erupting in a lingual position, and where the arch may or may not be slightly narrow. The lower incisors frequently peep through the gum in a position considerably lingual to normal in spite of the fact that there may have been ample room for them to have assumed their proper places in the arch. Other cases which Nature will often succeed in correcting, are those in which the upper incisors are more or less out of alignment while erupting, with the arch slightly constricted, or not, as the case may be.

But suppose Nature of herself is unable to complete the corrective operation in these cases, suppose there is some obstacle interfering with her efforts to such a degree that she must have the assistance of an

orthodontist to complete the work. Such slight malocclusion is probably not causing the child the least physical or mental injury, nor even inconvenience; and is it too late at nine or ten, or even eleven years of age, for the orthodontist to finish the work in such cases? In these instances, if he will be patient and wait a few years. Nature may surprise us with her accomplishments in orthodontia; and if she does not, if Nature has not succeeded in correcting the malocclusion, we have not lost anything by waiting. The case can probably be corrected as easily, or more easily, perhaps, at ten years of age than it could have been at five or six or seven.



Fig. 6.

An early start, according to the doctrine of "guiding such erupting tooth," usually involves carrying the treatment over the entire period of transition from the deciduous to the completion of the permanent denture, which means that the child must wear appliances on the teeth more or less continuously for five or six or seven years to accomplish what could just as well have been effected at a later age, and with much less effort in two or three years or less.

In those cases in which it seems necessary—or even desirable—at six or seven years of age, or even younger, to relieve an excessive malocclusion which may be interfering with the child's ability to masticate, or to breathe properly, or which may be in any wise affecting the health injuriously, such a case, in my opinion, should be relieved immediately. But relief in these cases does not imply the necessity of restoring ideal occlusion of the deciduous teeth; and it certainly should not indicate the beginning of an operation that must be continuous and uninterrupted over a period of six or seven years. The interference with the child's physical or mental development, which may be caused by the malocclusion, can probably be removed by restoring a fair amount of masticating surface and producing sufficient expansion of the arches to make room

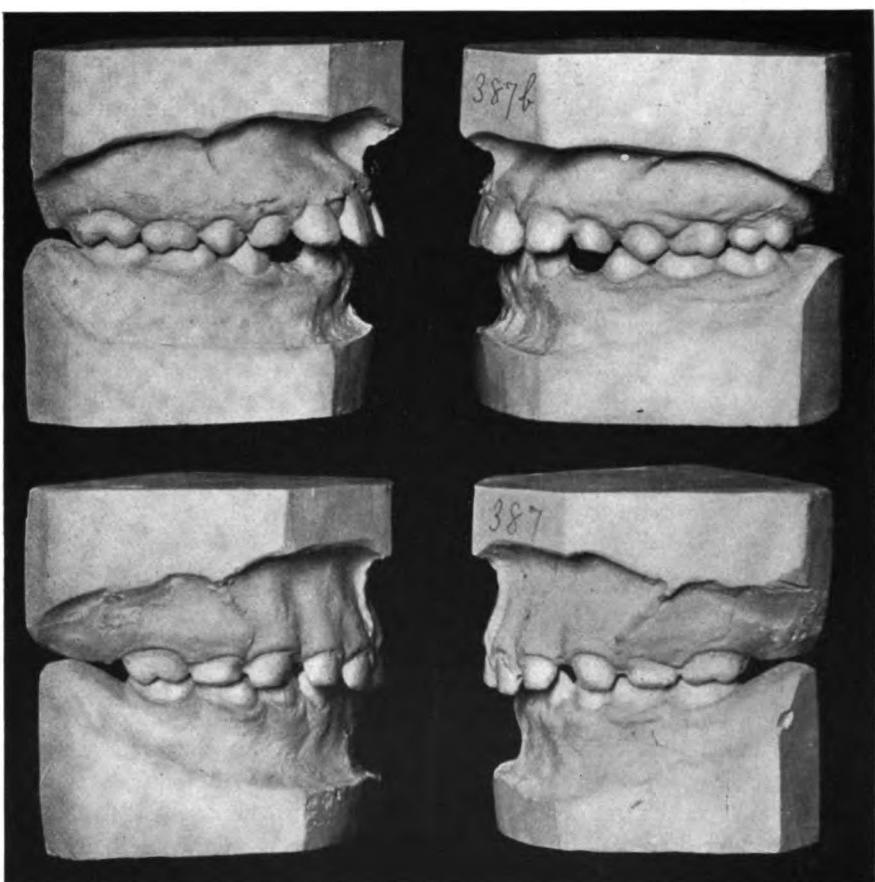


Fig. 7A.

for the tongue to occupy its proper position, and to relieve any constriction of the nutrient vessels or nerve channels that may have resulted from an excessively narrow arch. This effect can usually be accomplished by a few months of treatment, and the case can then be practically dismissed until the child is eight or nine years of age. After such an interval of waiting, during all of which time Nature has been unhampered and uninterfered with in her efforts, the treatment can again be taken up and carried to completion. Treated in this manner the case will, in all probability, be finished just as soon, according to the calendar, as it would have been had the treatment been carried along continuously from the beginning. The interval of "watchful waiting" has not been lost, but can be counted as time saved for the patient, the parent and the

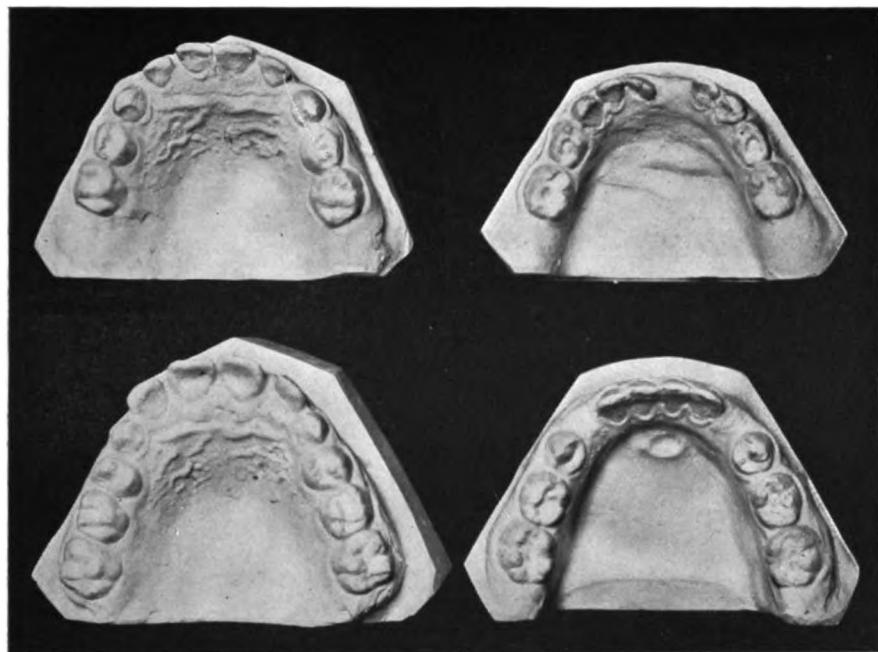


Fig. 7B.

operator. The period of treatment under such circumstances will probably cover two or three years, instead of six or seven.

In my opinion, the percentage of our cases that really require this very early treatment for the relief of retarded physical or mental development is very small in comparison with the whole number who are afflicted with malocclusion. Probably ninety per cent. or more of the patients who present to any of us for treatment will measure up to the average child of their age in height, weight and mental activity, their parentage considered.

Between the ages of six or twelve years children seem to thrive without the benefit of a large area of masticating surface—nature appears to have provided other means to compensate for the period of dental transition, during which time the masticating utility of the dental organs is so much reduced.

I believe each one of you will agree with the following proposition as a basic principle in orthodontia:

Final results being equal, the fewer and simpler the appliances used in the treatment of malocclusion, and the shorter time the appliances remain on the teeth, the better for the patient, the parent and the orthodontist.

This paper may be considered an appeal in behalf of our little patients for the adoption of the principle in our practice.

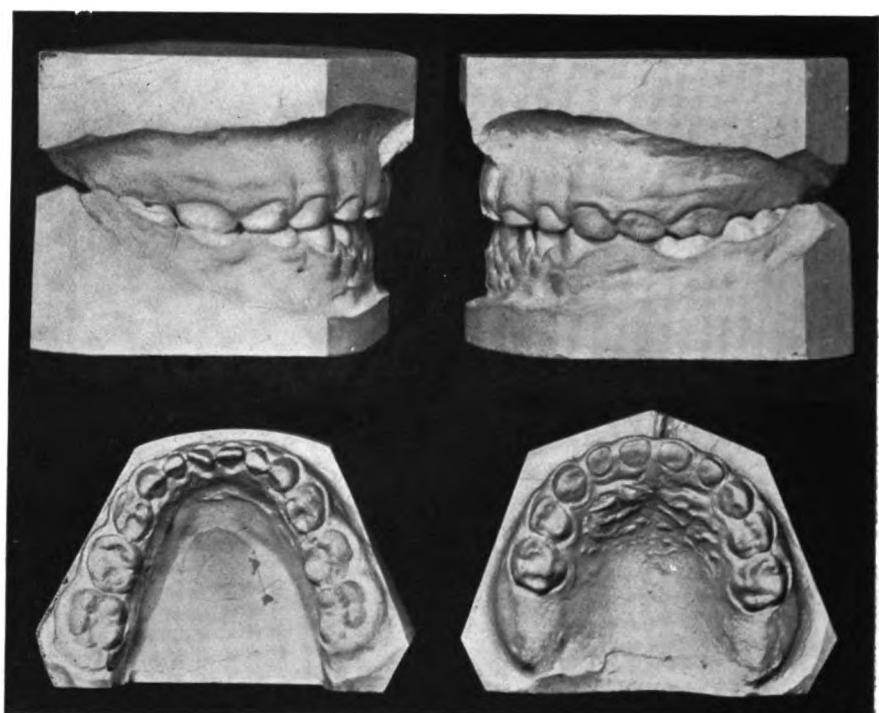


Fig. 8.

Illustrations.

A few illustrations may serve to bring out more clearly the points which I have tried to describe: Description—"Fig. 1 is made from a skull with a very wide arch and a narrow, compressed nose. The outside measurement of the arch is 66 mm. The nose should be 35 mm., but is only 20 mm. It will be noticed that the maxillary sinuses are very large, which is usually the case where the nose is so narrow. When the nose is wide the antra are often small, or even may be undeveloped."—*Cryer*.

"Fig. 2 is made from a skull showing one of the narrowest arches in my collection. The width of the arch across the outside of the second premolar is but 44 mm., while the floor of the nose measures 35 mm., one of the widest I have at this point of measurement."—*Cryer*.

Fig. 3—Shows the front, side and occlusal views of the mouth of a boy, aged seven years and seven months. The upper central is .35 of an inch in width; the arch, both upper and lower, are perceptibly narrow; the upper centrals are abnormally spaced; and the room for the permanent laterals, which have shown no sign of erupting, is constricted to



Fig. 9.

about half what it should be. The lower incisors are markedly crowded and out of alignment, and the arch is narrow.

Fig. 4—Shows the front, side and occlusal views of the same mouth two and a half years later, at the age of ten years and one month. The four upper incisors are in practically perfect position and alignment. The laterals, which are .25 of an inch in width, have forced themselves into the constricted spaces which were only .10 and .19 of an inch, respectively; the space between the centrals has closed in a perfectly normal manner; and the four incisors occupy 1.14 inches of space between the canines, which is .20 inch increase during the eruption of the laterals.

This one instance in itself tells a wonderful story of what Nature can accomplish in many of these cases if allowed to do so in her own way. When this boy was seven years of age, circumstances over which the parents had no control, made it practically impossible for them to give the time necessary for the treatment of the case, and much to their regret at the time and the regret of the orthodontist the work had to be indefinitely postponed. But it was postponed with the parents under-

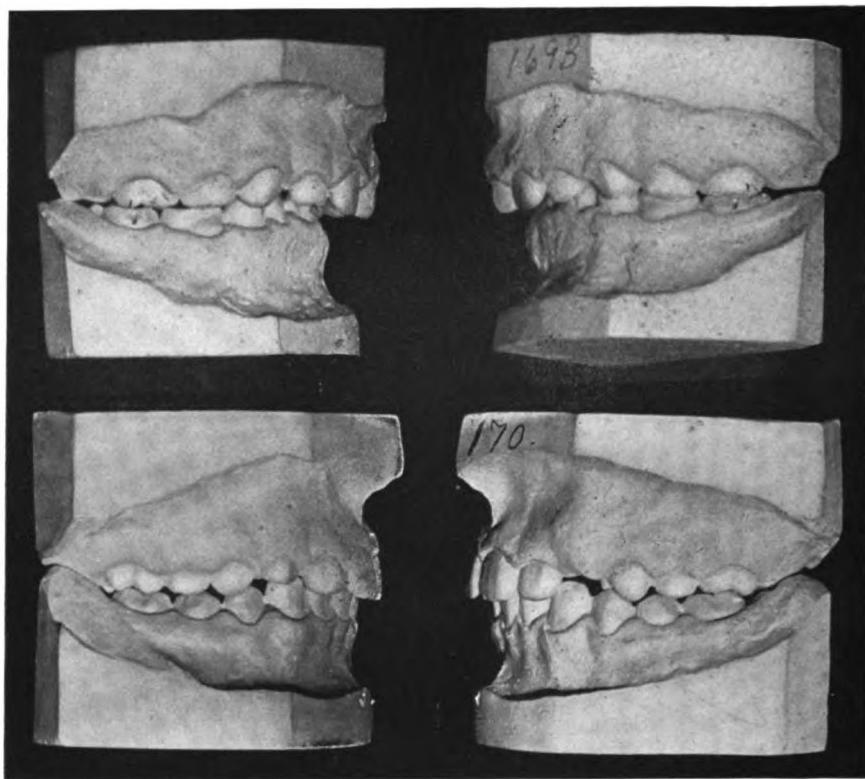


Fig. 10A.

standing that the malocclusion would grow worse and that later the treatment would involve more time, be more difficult and more expensive. The case, however, was never treated in any way, and to-day, at ten and a half years of age, the occlusion is practically perfect, and no amount of treatment in two years and a half could have bettered the result that Nature has accomplished unaided.

Fig. 5—Shows the occlusal and front views of the mouth of a girl, aged nine years. When this child was about three years of age the parents were advised to have the ligament between the two upper front teeth burned out and the teeth drawn together. Later, when the child was about six and a half or seven years of age, they were again advised to have the arches widened and the front teeth straightened—the lower incisors were crowded and the arch was slightly narrow. The parents neglected to have the work done, the case was never treated, and to-day the child's teeth are practically normal, except for a very slight narrowness in the lower canine region.

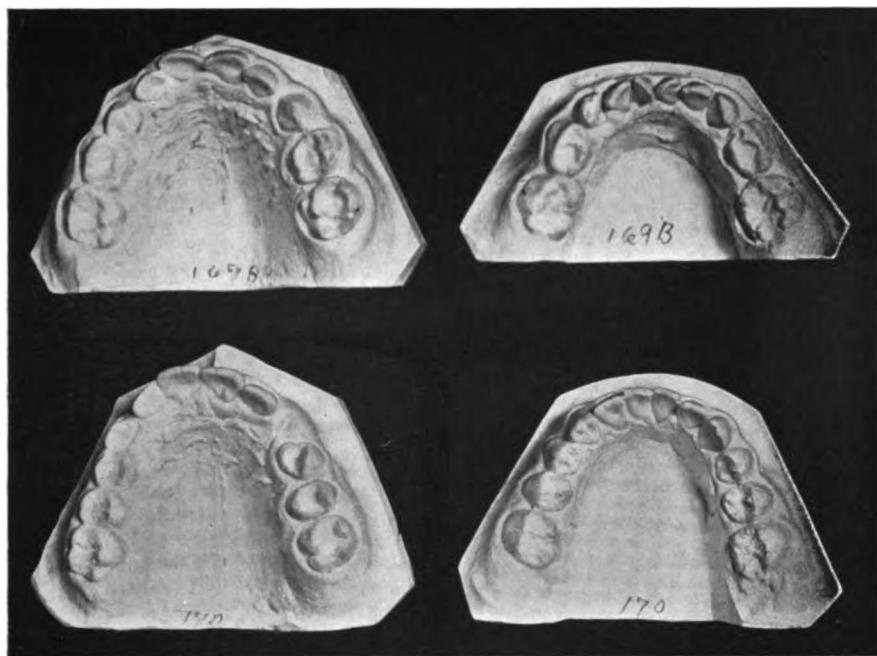


Fig. 10B.

Fig. 6—Shows where a right upper canine .30 of an inch in width has forced itself into a space .15 wide by pushing the other teeth aside without greatly disturbing their alignment.

Figs. 7A and B—Show the "before and after" models of a child who has been under treatment for five years, and who still has appliances on the teeth. The original model, so far as I am able to diagnose the condition, was practically normal, and, I believe, if the case had never been treated in any manner the result would be better than it is now after five years of treatment.

Fig. 8—Shows a somewhat similar condition in the mouth of a child between six and seven years of age. The upper arch is well developed, the deciduous incisors and canines are spaced and the arch is to all appearances normal. The lower arch is slightly narrow in the region of the incisors and canines, but very slightly. The parents have been advised to have these arches expanded and the lower central incisors rotated. If it were my own child I would not think of disturbing the natural development that is taking place there at this time.

Fig. 9—Shows the casts of the mouth of a child six years of age, and indicating a very decided tendency toward a Class III condition. I felt

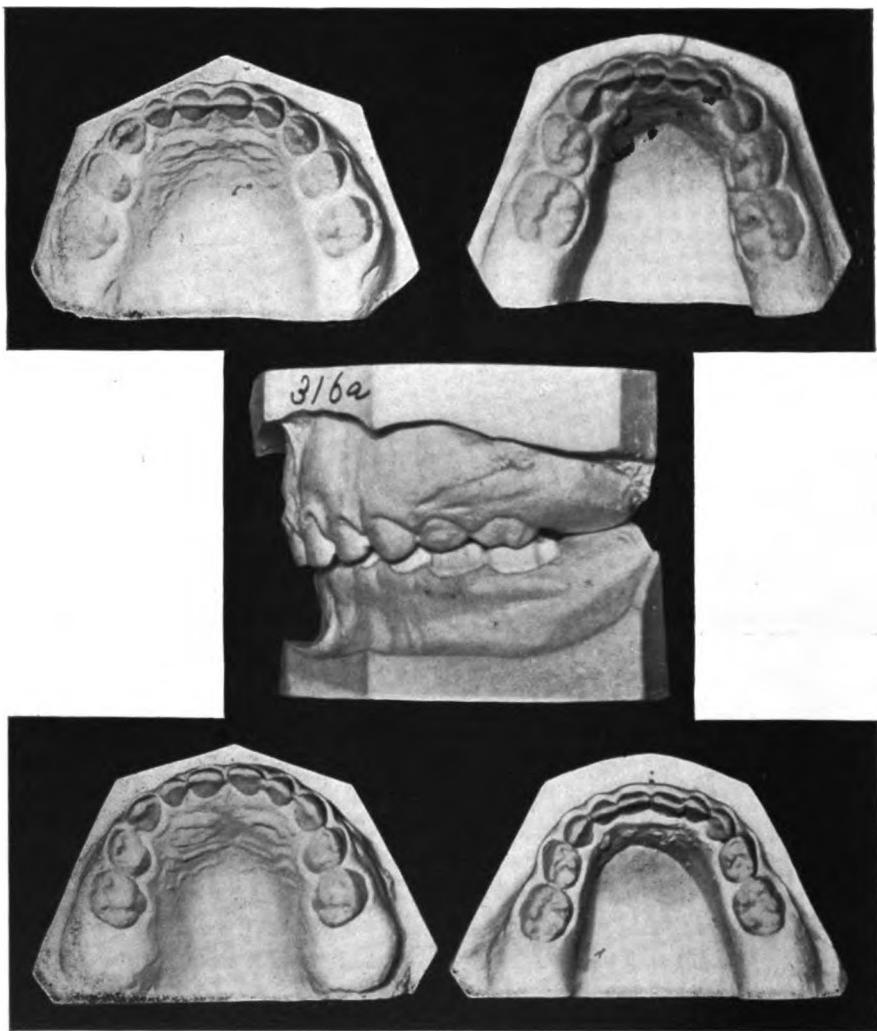


Fig. 11.

that this malocclusion should not be allowed to continue, and therefore treated it immediately. Within about six months the result was most satisfactory; all retainers were removed and the deciduous teeth remained in nice position, but when the permanent teeth began to appear the lower incisors erupted quite lingual to the deciduous ones, and as the transition progressed there was a gradual drifting toward what you see in the second set of casts, a subdivision of Class II. As I see this case now



I have no assurance that the permanent teeth, had it not been treated at all, would have erupted into a Class III position; neither is there evidence that any harm would have resulted from a delay of two or three years; perhaps they might have erupted normally, instead of drifting into the position as shown; who knows?

Figs. 10A and B—Show the casts of a Class II case that I began to treat when the child was a little past four years of age, and I have been treating it more or less ever since, which is about six years. This does not mean that the teeth have had appliances on during all of this time, but that they have been under supervision for this length of time. The arches in the original casts were fairly well developed and the child had a fair amount of masticating surface, and the child was therefore not suffering physically from the malocclusion. In such a case to-day I would postpone treatment till a later age, with the feeling that the same result could be accomplished with a less expenditure of time and energy for both the patient and the operator.

Fig. 11—Shows the case of a child five years of age, in which the teeth of the lower arch closed entirely inside of the upper; there was no masticating occlusion whatever. Here is a case in which I believe very early treatment is advisable in order to give the child a fair masticating surface. The lower arch was expanded, and the upper arch was contracted slightly, which brought the molars and canines into occlusal contact and gave the child a masticating occlusion. The teeth were retained in this position for a short time, and the case was dismissed for a period of two or three or four years; or, in other words, treatment is to be taken up again at any time when it seems to be needed. The side view shows the position of the teeth, mesio-distally, as they were when treatment was discontinued. I left them in Class II malocclusion.

I am firmly convinced that a large percentage of the treatment of cases of co-called malocclusion in the mouths of young children is entirely unnecessary, and that in many of these cases Nature without interference could and would do the work far better than any orthodontist could possibly do it.



The Role of Endamoeba Gingivalis in Pyorrhea.

In the issue of the *Journal of the American Medical Association*, of the date of February 13th, the leading article is entitled "Pyorrhea Dentalis and Alveolaris," over the signatures of Drs. Bass and Johns, the bacteriologists of New Orleans.

It is unfortunate that men at times overlook the fact that their prominent position in the profession adds an authoritative note to their utterances which should cause them to be most cautious in voicing new theories in regard to the etiology and treatment of disease.

In their communication to the *Journal of the American Medical Association*, Drs. Bass and Johns announce that:

"The specific cause of pyorrhea dentalis and alveolaris is endamœbas."

These are the most remarkable ten words that the writer has ever read in medical or dental literature. In this one and a half lines of type the writers not only dogmatically close all discussion as to the etiology of pyorrhea, a discussion, by the way, that has been continuously carried on for a quarter of a century, but at the same time they give us a new classification, with a new name for the earlier phases of the disease. Verily this is quite an accomplishment. A contribution to classification, terminology, and etiology, all expressed in ten words.

The dental profession has long criticised the term "pyorrhea alveo-

laris," "pus from the alveolus," because pus from the alveolus is not always an expression of the particular lesion which the term is supposed to describe. Now these medical authors present to us a new term, "pyorrhœa dentalis," "pus from a tooth," a symptom which is never present in the disease under discussion. With full recognition of the previous valuable services of these gentlemen, and of the prominence in the medical profession which they enjoy, indeed because of these very facts, the writer respectfully protests against the introduction of this new term, "pyorrhœa dentalis," as likewise does he protest against the dogmatic statement without adequate proof that the "specific cause of pyorrhœa alveolaris is endamœbas."

Already this article has caused the injection of emetin into the systems of hundreds of human beings; already this article is quoted in commercial advertisements to help the sale of emetin, ipecac and preparations thereof; already the men of trade have placed on the market sure-cure tooth pastes and tooth washes containing ipecac and guaranteed to prevent or cure pyorrhœa alveolaris; already dental incompetents who had abandoned the treatment of pyorrhœa alveolaris, and had adopted the habit of referring sufferers to men of skill, are now resuming the treatments of the disease, adopting the recommendations of Drs. Bass and Johns and assuring the patients that at last the problem has been solved.

But has it?

It is the view of the writer that the problem of the cure of pyorrhœa alveolaris has not yet been solved. It is likewise his opinion that the rôle of the endamœba has not yet been sufficiently proven, nor even studied, to warrant the assertive statement by Drs. Bass and Johns, and the conspicuous publication in so important a magazine as the *Journal of the American Medical Association*, of the claim that "the specific cause of pyorrhœa alveolaris is the endamœbas."

Premature announcements of this sort, widely copied into the lay press, raise hopes and expectations on the part of the public which, when unsatisfied and unfulfilled, undermines the faith of patients in practitioners, both of medicine and dentistry.

**Announcements of
Barrett and Smith.**

Much more conservative, much more cautious, and we think for these reasons much more scientific, have been the communications on the same subject By Drs. Barrett and Smith, as expressing perhaps

the best present thought on the subject the following quotations are made from a paper by these authors read before the Toronto Dental Society, March 8th, and published in the April issue of *Oral Health*, a careful study of which is recommended to all interested in the subject.

The following language is in strong contrast with the brief assertion by Drs. Bass and Johns. Drs. Barrett and Smith tell us that:

"It should be acknowledged here that no proof exists to-day that these oral endamoebæ are the sole specific cause of the large group of pyorrhea lesions in which they are to be found. They exist in these lesions in association with a large number of bacterial species, leptothrix threads and several species of spirochaetes, and it is impossible to say that none of these associates are not also culpable with the protozoan parasites"

The writers then continue as follows:

"The proof of some (and probably an important) part of causal influence attaching to the endamoebæ rests thus far upon: (a) the constancy of their occurrence in pyorrhea pockets; (b) their absence from the mouth of control subjects; (c) and the disappearance of both suppuration and of amoebæ upon the proper employment of emetin. Of course, the associated organisms also disappear from the pockets with the cessation of suppuration, but not as completely as do the amoebæ; and while the amoebic parasites, as far as protracted search upon our part has shown, disappear completely from the mouth, many at least of the associated organisms persist in the food and salivary mixtures to be found in the gingival grooves and in other protected positions. Emetin has proved, both *in vitro* and in the treatment of other amoebic affections, as dysentery, to be lethal to amoebæ, even when in high dilution; its influence upon bacteria is largely unstudied, but for the few species for which it has been tested it shows but low bactericidal power, even in strong solution. It is therefore a natural and reasonable inference to hold, until proof to the contrary is presented, that these protozoan parasites, if not solely responsible, are at least largely responsible for the production of the lesions in question."

Drs. Barrett and Smith then give their present opinion of the rôle of the endamoeba in the following language, which must receive respectful consideration even from the most violent opponents of the view that endamoebæ exert a pathogenic influence:

"The writers incline to the belief that they really act in symbiotic relation with some or all of the vegetable organisms with which they are in association in Nature; that by their proteolytic power they prepare a highly fitting pabulum for the growth of bacteria in the form of end

products of their digestion of leucocytes, red blood cells and perhaps fixed cells as well, and thus favor a rank mycotic growth about them; that by their ingestion and destruction of these bacteria they set free a not inconsiderable amount of bacterial toxins of different kinds and of varying influences; that these toxins are locally necrosing and of essential importance in determining and maintaining the gingival and alveolar inflammation, and, too, may be diffused and be productive of a widespread series of complications in the body of the host, commonly discussed in connection with the 'oral sepsis' of Hunter."

The authors then refer to the fact that objection has been made "that the classic postulates of Koch have not been fulfilled, and that the claim of endamoebic pathogenicity is therefore not demonstrated," and they proceed to a defense of their position and view, well worth reading, but for which we have not space to quote. We cannot, however, refrain from republishing the following advice, because it is at once so temperate and so rational:

Treatment Recommended by Barrett and Smith. "The proof of their pathogenicity is not perfect, we admit, even though an efficient remedy has been provided; but the probability of the correctness of our suspicions is sufficiently established to make the assumption of pathogenicity of these endamoebæ a credible working theory. As such it will remain until it is finally verified, or absolute proof to the contrary presented; and the writers feel that in any academic discussion or in any experimental procedures leading into discussion, at this time the burden of proof falls upon the objectors. We have at no time refused the idea that the associated bacteria are contributing factors; as above stated, we suspect they and the amoebæ are linked in a symbiotic chain—and a chain is broken when any link of it is shattered. So, thorough local antisepsis and proper vaccines may also be expected, by destroying the bacteria, to yield beneficial results; and in many cases the association of the two measures may hasten and may more certainly establish a final cure. But because of its convenience of application, its almost uniformly good effects, the absence of any painful effects upon the patient, we feel that emetin should stand first among remedial agents and measures when ordinary amoebic pyorrhea cases present themselves. There is reason to scale the teeth in connection with the treatment, but the scaling should be gently done to disturb the loosened tooth as little as possible; and indiscriminate instrumentation is painful and often is really meddlesome in that it results in mechanically breaking the wall of the pockets and further disturbing the toxic and microbic contents into the surrounding tissues. Antiseptics are surely

indicated, yet indiscriminately applied and in too high concentrations they may destroy tissue which we should endeavor to preserve. Vaccines are in theory admirable, and in practice they often realize their purpose; but their use is not always convenient, is sometimes attended by unpleasant general reactions, and they are sometimes utter failures from some fault of technique, presumably."

**The Apparently
Rational
Procedure.**

At present there seem to be no less than three distinct views. Some believe with Bass and Johns that the endamœba is the specific cause of pyorrhea. Many more will agree with Barrett and Smith that *the endamœba when present exerts a pathogenic influence which may well retard cure even though it may not have been the specific causative agent.* Still others adopt the opposite extreme and declare that the endamœbæ, though present in pyorrheal pockets, are harmless, and perhaps even helpful residents therein.

The last postulate seems to the writer, in the light of the communications by Drs. Barrett and Smith, even more untenable than the announcement by Drs. Bass and Johns. It would therefore seem to the best interests of the patient to at least tentatively adopt the theory of Drs. Barrett and Smith that the endamœbæ do exert a baneful influence *when present*. But would it not be rational before exhibiting emetin to determine whether or not the endamœbæ be present? The writer thinks so, and for this reason has solicited from Thomas Le Cléar the article published in this issue describing a method of definitely determining the presence or absence of the endamœbæ.





WELL, I HAVE a few replies; not exactly answers, but anyway replies. To

- ❖ what? Why to the great problem: "How can the Average Dentist
- ❖ properly fill a root canal, using radiography, when his patients expect
- ❖ the entire operation, including the filling of the cavity, to cost no more
- ❖ than five dollars."



I THINK I MADE A PROMISE (or was it a threat), that if some one did

- ❖ not answer this question, I would answer it myself. But it begins to
- ❖ appear that the patient will pretty soon solve this problem for the den-
- ❖ tist. The following is an actual occurence; I know this because the
- ❖ man who related it to me is a lineal descendant of George Washington;
- ❖ his name is George, too, come to think of it.



FRIEND GEORGE has a radiographic outfit. Enter woman of moderate

- ❖ means. Statement: "Doctor, I have a lateral incisor that is a little out
- ❖ of line, and a dentist persuaded me to let him cut it off in order to crown
- ❖ it. He killed the nerve and took it out, and then he filled the root. I
- ❖ have not had it crowned yet, because it has been tender to the touch
- ❖ ever since, and I would like you to tell me what the trouble is. Another
- ❖ dentist told me the first man must have perforated the root." Friend
- ❖ George explained that he could not make a diagnosis without an X-ray
- ❖ picture, and that his fee would be five dollars.



AFTER TAKING THE picture, Friend George gave an appointment for the

- ❖ patient to return for an opinion. When she called he showed her the
- ❖ radiograph, indicating to her the presence of a small blind abscess, and
- ❖ the absence of any root filling at the upper third of the root canal.
- ❖ The patient then asked what his fee would be to unfill, treat and refill.
- ❖ The estimate was indefinitely set at between thirty and fifty dollars.



AFTER A PROLONGED study of the radiograph the woman made the fol-

- ❖ lowing illuminating reply: "I would like appointments for the work. I
- ❖ have an appointment with another dentist, for to-morrow morning, to
- ❖ care for this tooth, but I will cancel it, because when I told him that I

Items of Interest

- ❖ was having a radiograph taken he told me I could 'blow' five dollars on
- ❖ a radiograph if I wanted to but he would not need it. That he has done
- ❖ without the X-ray for thirty years, and he guesses he does not need it.
- ❖ He also pointed out that he would only charge me ten dollars for treating and filling the tooth, while the X-ray dentists would want more."

■ ■ ■

FRIEND GEORGE told the woman that he did not wish to have her leave

- ❖ another dentist to come to him, but she interrupted him to remark:
- ❖ "Excuse me Doctor, but I had one man fill that tooth by *guess work*,
- ❖ and your picture shows he made a poor guess. I am going to let you
- ❖ treat my tooth, but when you have filled the root, I want you to take
- ❖ an X-ray and let me see it."

■ ■ ■

THERE IS FOOD for very deep and very serious thought in this story, and

- ❖ a mighty good moral. Here is a woman who has an opportunity to
- ❖ have an old reliable dentist of experience treat and fill her tooth for a
- ❖ flat fee of ten dollars, yet she elects to patronize a man who will charge
- ❖ her between thirty and fifty dollars. Why? Because when the radiographic process is explained to her, she immediately recognizes that the
- ❖ old way is all *guess work*. Moreover she stipulates that the dentist
- ❖ shall show her the radiograph of the completed root filling.

■ ■ ■

AND THAT WILL prove to be the final solution of this whole question.

- ❖ Patients will require radiographic proof that roots have been properly
- ❖ filled, before settling their accounts. When that day arrives dentists
- ❖ will no longer declare that they cannot afford to install X-ray outfits.
- ❖ They will discover that they cannot afford not to do so. And this
- ❖ brings us to the letters that have been received.

■ ■ ■

DR. W. W. SWEENEY, of Los Angeles, states the following facts: "The

- ❖ cost of a first-class X-ray equipment, which will enable the operator to
- ❖ take a picture in three seconds, is not over \$225.00. The interest on this
- ❖ investment at 8% per annum is \$18.00 or \$1.50 per month. Should the
- ❖ number of radiographs not exceed ten a month the overhead cost per
- ❖ film would be 15 cents each. The films cost less than 10 cents each,
- ❖ and the operator's time in exposing and developing will not exceed ten
- ❖ minutes, which figures, at the rate of \$3.00 per hour, 50 cents, and adding
- ❖ to this an outside figure of 5 cents for the developer used, gives a total
- ❖ cost of 80 cents for the production of a radiograph. To me the question
- ❖ seems to be, not 'can a dentist afford an X-ray equipment' but rather
- ❖ 'can he afford to be without it?' and in this I am supported by such
- ❖ eminent authorities as Dr. Howard P. Raper, of Indianapolis, and
- ❖ others."

■ ■ ■

THE ARGUMENTS of Dr. Sweeney are sound. In this section of the

- ❖ world, as men's fees vary, and as likewise the cost of the equipment may
- ❖ be more than the above quotation, the expense of making a radiograph
- ❖ has been figured out exclusive of these items of dentist's time and interest on investment, and it has been declared that 16 cents is the actual
- ❖ cost of producing a radiograph.

DR. E. C. STEINSIECK, of Hightstown, N. J., writes as follows: "I am
◆ an average dentist. Three to five dollars is all I can collect for the
◆ treatment, filling (?), of the canals and the tooth. The average phy-
◆ sician does not perform many operations, but sends them to a hospital
◆ where proper facilities are to be had, and where some arrangement can
◆ be made for people in moderate circumstances. Could not local dental
◆ societies purchase X-ray machines and have them operated in conjunc-
◆ tion with a hospital where members could obtain pictures at a moderate
◆ fee? Or might not one centrally located member have charge of it and
◆ arrange certain hours when patients of other members could procure
◆ pictures?"



DR. WILLIAM MENDELSON, of Brooklyn, writes somewhat similarly.
◆ He says: "The solution seems to me to lie in co-operation. Just as
◆ farmers unite to equip and maintain a grain elevator so dentists might
◆ establish an X-ray laboratory. Suppose that one hundred dentists
◆ should contribute ten dollars each to cover the original outlay, and five
◆ dollars per month thereafter, could not an X-ray laboratory be main-
◆ tained for the benefit of these subscribers only so that pictures could
◆ be obtained at a minimum cost?"



NUMEROUS OTHER communications have been received, every one of
◆ which contains some valuable thought on the general subject, but the
◆ above are the only ones that even attempt a solution of the immediate
◆ problem. And now I must admit that these writers have between them
◆ guessed one proposition that I had to offer. There is no doubt that a
◆ co-operative laboratory might be made of mutual advantage in reducing
◆ the cost of radiographs. Two plans are feasible. Perhaps the simplest
◆ would be for ten dentists, approximately neighbors, to unite in furnish-
◆ ing the capital needed for the equipment, and the radiographs could all
◆ be made by one man upon a mutually agreed basis. The larger scheme
◆ would be for a dental society to establish the laboratory, the members
◆ being assessed pro rata for its equipment. Accounts could then be kept
◆ with the subscribers, accurate records of the work sent to the laboratory
◆ by each being kept. Then at the end of each month, after deducting
◆ for operator's salary, expenses, etc., profits, if any, could be divided
◆ between the subscribers in the ratio of the business furnished by each.
◆ The laboratory might even do work for non-subscribers at an increased
◆ fee; for example, one dollar for a radiograph for a patient of a sub-
◆ scribe to the laboratory, and two dollars for non-subscribers.



THERE IS, HOWEVER, still another co-operative plan. Mr. Ford, the
◆ automobile manufacturer, once said that if he could sell as many cars
◆ of the grade of the Packard, as he could Ford cars, he could produce a
◆ car as good as the Packard, sell it for \$1,800.00 and make a profit. A
◆ furniture dealer once explained that a glass closet for the dining room
◆ costs more than a bookcase, because three of the latter are sold to one
◆ of the former. When X-ray outfits were limited as to sale, to specialists
◆ in radiography, the cost of a machine was necessarily higher than even
◆ now, when there is a growing demand for an outfit that a dentist may

- ◆ buy for his own use. If the majority of dentists would install outfits,
- ◆ as they will soon be compelled to do, then the cost will be still lower.
- ◆ But even at the present time, if twenty-five men would unite in giving
- ◆ an order for twenty-five outfits of similar style, I am assured by two
- ◆ dealers that they would gladly fill such an order at a considerable dis-
- ◆ count from present prices. In large dental societies then, this proposi-
- ◆ tion should be placed before their members, who should be urged to
- ◆ join a "club" to buy and install X-ray equipments.



BUT THESE ARE ALL only temporary expedients. The real solution of
◆ the problem must arrive by another route, and we may as well discuss
◆ it and face the facts now as later. The truth is that the dentists have
◆ but themselves to blame for their present dilemma. It is all a matter
◆ of the education of the public, and unfortunately in the past, dentists,
◆ have led patients to believe that the so-called "treatment" of teeth is a
◆ small matter, something to be "thrown in" with the filling operation
◆ with little or no added cost.



THE TRUTH is that the treatment and filling of root canals rank with the
◆ most difficult operations in general surgery, and far exceed all other den-
◆ tal work in importance and skill required. Unfortunately the dentists
◆ themselves have only just learned of the dire results which the patient
◆ may suffer from improper root canal treatment. But what is he to do?
◆ He has already taught the patient that the treatment is a small matter;
◆ worth little! What is he to do? What does he do? Sit in a corner
◆ and cry over the milk that he has spilled? But tears will not color his
◆ coffee. He must now as quickly as possible admit his error and cor-
◆ rectly inform his patient both as to the importance and the value of his
◆ service.



LET ANY DENTIST, even the so-called Average Man, with the low fee
◆ practice, frankly explain facts to his patient somewhat as follows:
◆ "Within the past few years we have discovered that many serious dis-
◆ eases, rheumatism, ulcerations of the stomach and the like, are due to pus
◆ poisoning from abscesses at the ends of teeth; and these abscesses are
◆ mainly due to the fact that the roots had been improperly filled. Since
◆ we have had the X-ray we have discovered that three quarters of all the
◆ roots filled in this country were improperly filled, because there was no
◆ way to know just how long a root canal really is. But now, with the
◆ use of an X-ray picture, we can get this knowledge, and consequently
◆ the best men are doing root canal work in this manner. That is why
◆ I must insist upon having one or two, or even more pictures if I am to
◆ do your work properly. Indeed, I am not willing to do it in any other
◆ way, because my conscience will not permit me to be responsible for
◆ the possible infection of your system which may come later on, if I do
◆ my root work improperly. It will be well worth the extra expense to
◆ you to be sure that the roots are properly treated, and I will prove it
◆ to you by giving you a picture of the work when I have finished. If



Around the Table

- ◆ you cannot afford the full fee now, I advise you to have the root work done properly now, and to have a temporary filling in the cavity until ◆ you can afford to have the cavity filled. The cavity is of the least consequence anyway. It is the root canal work that is important because ◆ upon that will depend your general health."



NOW, MR. AVERAGE DENTIST, don't say "it can't be done." Just try

- ◆ it. If a thousand Average Dentists begin educating their patients along these lines, within a year a full third of them would have X-ray equipments in their offices, and they would at once cease to be Average Dentists. They would have risen above the average.



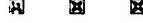
IT IS ONLY because of their ignorance that patients are unwilling to pay:

- ◆ fees that will permit the dentist to do good root canal work, and as it has been the dentist who has kept them in ignorance it is but a righteous sort of justice that the dentist should find himself in this dilemma.
- ◆ But there is no reason why the situation should continue. It is but a matter of education.



WHEN BRIDGEWORK first came into vogue, the advertising dentist did

- ◆ good service towards his fellow practitioners, when he advertised loudly that he could furnish "artificial teeth without plates." Quite often his product was no better, if as good, as the teeth supplied by his neighbor on a plate, but he collected more for his service. Why? Because he made his patient believe that what he supplied was worth more. Therefore the patient paid more.



IN LIKE MANNER patients have been made to pay more for a shell gold

- ◆ crown than the same dentist could have collected for a gold filling in the same tooth, when if the truth were known the gold filling would have served the patient better.



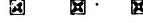
IF THEN THE CHARLATAN and the quack can collect more for a less

- ◆ valuable service, simply by informing his patient that the service rendered is valuable, why may not the ethical man similarly collect a better fee for a better service? There is no doubt that he can, if he but go about the matter in an honest and intelligent manner.



IN A NUTSHELL it comes to this. The dentist no longer does honest ser-

- ◆ vice if he fill a root canal without informing his patient that without the aid of the X-ray such work cannot certainly be done properly, and if improperly done that his general health may suffer. Then the patient, fully informed of the facts, may decide whether to pay the added fee or not.



BUT IT IS NOT fair for the Average Dentist to cry out: "I can't use the

- ◆ X-ray. My patients won't pay for it," until at least he has told the pa-

**Items of Interest**

- ❖ tient the truth, that without the X-ray he, the Average Dentist (nor any other dentist), cannot fill root canals without possible danger to the patient's health and even life. I would like some conscientious Average Dentist, who thinks otherwise, to explain matters to ten of his poorer patients, and then report to me exactly what replies these patients make.



THERE IS ANOTHER factor which will influence the solution of this problem, and that factor is the Family Doctor. When the Family Doctor comes to fully appreciate the great truth promulgated by Hunter, and much resented in this country at that time, that a majority of all bridge-work is a menace to the health of the patient, the beginning of the end will have arrived. When every physician who finds a bridge in a patient's mouth, insists upon having radiographs of all the roots used as piers; and when the radiographs show improper root filling, advises the patient to demand his fee back from the man who made the bridge; and when a few malpractice suits have been settled against dentists and brideworkers for improperly filling root canals, without informing patients of the facts; and when all patients take the course of the woman who informed Friend George that she would intrust her work to his care, but that she would wish to see an X-ray picture of the root after filling, then will this problem have been solved.



BECAUSE JUST so soon as patients begin to ask for radiographic proof that their root canals have been properly filled, then will they be willing to pay for the radiographs, and all dentists will have X-ray outfits, because compelled to do so.





April 7, 1915.

To the Editor of ITEMS OF INTEREST.

Dear Doctor:

In the March number of the ITEMS OF INTEREST, "B. E. L.", reviewing the second German translation of the seventh edition of Dr. Angle's well-known "Malocclusion of the Teeth," says: "The first German edition appeared in 1908, a year after its publication in America, and this early demand for a second edition is the best evidence of the interest our German colleagues take in this phase of dental practice. The seventh American edition is not yet exhausted, and thus proves again the soundness of the charge so frequently made by publishers, viz., American dentists are poor book buyers."

As your reviewer appears to be somewhat misinformed relative to the demand of the American edition, it seems unjust to accuse the American dentists of being "poor book buyers." Though the first German edition was exhausted well within a year after its publication, and the second edition being now nearly sold out, it, nevertheless, is of interest to know that the seventh *American* edition, far more extensive than the German, was quickly disposed of after its appearance, necessitating *two subsequent reprints*, both of which are now exhausted. Furthermore, with the demand for this work constantly increasing, the author is hard at work preparing the eighth edition, revised and enlarged, which is almost ready for the press.

This tends to prove an old saying of "Bob" Burdette that "people are pretty much like people," whether they be German dentists or American dentists. Given a book of merit it will be in demand here as it is abroad, provided its author is not content to "stand on the shoulders of others" for his materials and thoughts.

Cordially yours,

MILO HELLMAN.



National Society Meetings.

PANAMA-PACIFIC DENTAL CONGRESS, San Francisco, Cal., August 30 to September 9, 1915.

Secretary, Dr. Arthur M. Flood, 240 Stockton St., San Francisco, Cal.

State Society Meetings.

ARIZONA STATE DENTAL SOCIETY, Phoenix, Ariz., November, 1915.

Secretary, Dr. J. L. O'Connell, Phoenix, Arizona.

COLORADO STATE DENTAL ASSOCIATION, June 17, 18, 19, 1915.

Secretary, Dr. Earl W. Spencer, 119-120 Pope Block, Pueblo, Colo.

FLORIDA STATE DENTAL SOCIETY, Pass-a-Grille, Fla., June 9-11, 1915.

Secretary, Dr. Alice P. Butler, Gainesville, Fla.

GEORGIA STATE DENTAL ASSOCIATION, Atlanta, Ga., June 17-19, 1915.

Secretary, Dr. M. M. Forbes, 803 Candler Bldg., Atlanta, Ga.

KENTUCKY STATE DENTAL ASSOCIATION, Ashland, Ky., June 8-10, 1915.

Secretary, Dr. Chas. R. Shacklette, The Atherton Bldg., Louisville, Ky.

Society Announcements

LOUISIANA STATE DENTAL SOCIETY, Grunewald Hotel, New Orleans, La.,
June 3-5, 1915.

Secretary, Dr. P. Trowbridge, Franklin, La.

MAINE DENTAL SOCIETY, Portland, Me., June 28-30, 1915.

Secretary, Dr. I. E. Pendleton, Lewiston, Me.

MARYLAND STATE DENTAL ASSOCIATION, Baltimore, Md., June 10-11,
1915.

Secretary, Dr. F. F. Drew, 701 N. Howard St., Baltimore, Md.

MINNESOTA STATE DENTAL ASSOCIATION, Minneapolis, Minn., June 11-
12, 1915.

Secretary, Dr. Max E. Ernst, 614 Lowry Bldg., St. Paul, Minn.

MISSOURI STATE DENTAL ASSOCIATION, Golden Jubilee Meeting, Jeffer-
son City, June 10-12, 1915.

Secretary, Dr. S. C. A. Rubey, New York Life Bldg., Kansas City,
Mo.

MONTANA STATE DENTAL SOCIETY, Helena, Mont., July 15-17, 1915.

Secretary, Dr. F. W. Adams, Chicago Block, Billings, Montana.

NEW HAMPSHIRE STATE DENTAL SOCIETY, Weirs, N. H., June 22-24,
1915.

Secretary, Dr. Louis I. Moulton, 15 No. Main St., Concord, N. H.

NEW JERSEY STATE DENTAL SOCIETY, Asbury Park, July 21-24, 1915.

Secretary, Dr. John C. Forsyth, 430 E. State St., Trenton, N. J.

NEW MEXICO STATE DENTAL SOCIETY, Albuquerque, N. M., date will
be announced later.

Secretary, Dr. J. J. Clarke, Artesia, N. M.

NORTH CAROLINA DENTAL SOCIETY, Wrightsville Beach, N. C., June 23-
25, 1915.

Secretary, Dr. R. M. Squires, Wake Forest, N. C.

OHIO STATE DENTAL SOCIETY, Columbus, Ohio, December 7-9, 1915.

Secretary, Dr. F. R. Chapman, 305 Schultz Bldg., Columbus, Ohio.

PENNSYLVANIA STATE DENTAL SOCIETY, Reading, Pa., June 22-24, 1915.

Secretary, Dr. L. M. Weaver, Philadelphia, Pa.

SOUTH DAKOTA STATE DENTAL SOCIETY, Rapid City, S. D., July 22-24,
1915.

Secretary, Dr. T. E. Johnson, Rapid City, S. D.

TENNESSEE STATE DENTAL ASSOCIATION, Sewanee, Tenn., June 24-26,
1915.

Secretary, Dr. C. Osborn Rhea, 625½ Church St., Nashville, Tenn.


Items of Interest

UTAH STATE DENTAL SOCIETY will meet in San Francisco, Cal., during the Panama-Pacific Dental Congress in August, 1915.

Secretary, Dr. E. C. Fairweather, Boston Bldg., Salt Lake City, Utah.

VIRGINIA STATE DENTAL ASSOCIATION, Richmond, Va., Nov. 4-6, 1915.

Secretary, Dr. C. B. Gifford, Norfolk, Va.

WISCONSIN STATE DENTAL SOCIETY, Oconomowoc, Wis., July 13-15, 1915.

Secretary, Dr. O. G. Krause, 1209 Wells Bldg., Milwaukee, Wis.

Report of Dr. Jos. D. Eby.

Member Transportation Committee, International Dental Congress; Member Transportation Committee, National Dental Association.

ATTENTION SOUTHERN DENTISTS:

The time is now approaching when all members of the National Dental Association should begin to consider seriously their prospective plans of attending the joint session of the National Dental Association and the International Dental Congress to be held in San Francisco, at the Panama-Pacific Exposition, August 30th to September 9th.

This is the opportunity of a life-time to combine business and pleasure in a Western trip.

The wide range for the selection of literary and clinical material, also exhibits, has placed the International Dental Congress meetings of the past among the greatest in dental history. The Organization Committee of this Congress have been at work more than two years, and it is safe to predict that this Congress will eclipse all other similar meetings of the past.

The question of itinerary is governed almost entirely by the time one wishes to spend. Stopovers and varied routings can be arranged with practically no additional transportation expense, excepting over the Northern lines.

As a member of the Transportation Committee of the National Dental Association, also same committee, Panama-Pacific Dental Congress from the territory including North Carolina, South Carolina, Tennessee, Georgia, Florida, Alabama and Mississippi, much time has been spent in considering the numerous routes, etc., with a view toward being able to make the best recommendations to members from this territory.

I beg to advise, after careful consideration, I have decided the most practical, attractive, and best way for the dentists in the Southeast who expect to attend this meeting will be to make New Orleans a concentrating point, and have therefore arranged with the Southern Pacific Railroad to operate special private Pullman sleeping cars from New Orleans through to Los Angeles on the following schedule:

Lv. New Orleans.....	11:30 P.M., Aug. 19th,	SP. Train No. 9
Ar. Houston.....	11:30 A.M., " 20th,	" " "
Lv. "	11:50 A.M., " 20th,	" " "
Ar. San Antonio.....	7:20 P.M., " 20th,	" " "
Lv. "	8:50 P.M., " 20th,	" " "
Ar. El Paso.....	6:30 P.M., " 21st,	" " "

**Society Announcements**

Lv. El Paso	6:00 P.M., Aug. 22nd, SP. Train No. 9
Ar. Los Angeles.....	9:20 P.M., " 23rd, " " "
Lv. " "	7:25 A.M., " 28th, " " " 21
Ar. San Francisco.....	10:55 P.M., " 28th, " " "

1 hour, 5 minutes stopover at San Antonio.

25 hours, 50 minutes stopover at El Paso.

4 days' stop over at Los Angeles.

You will note this schedule shows our arrival in El Paso 6:30 P. M., 21st, leaving 6:00 P. M., 22nd, or stopover at that point of approximately 24 hours. Delegates can spend night on car, using berths, instead of hotels. This was arranged on account of invitation extended by the El Paso Chamber of Commerce offering us an excellent free trip in and around the City of El Paso, together with side trip over the border line to the City of Juarez, Mexico, which I am sure will prove very enjoyable. Also please note that stopover is made at Los Angeles of four days, which is arranged for sight seeing in and around that city, together with plenty of time to make side trip to San Diego to see the Exposition at that point, without additional transportation expense.

On arrival in Los Angeles, the private Pullman cars will be dispensed with, and from there to San Francisco, Pullman parlor observation cars will be used, and the schedule, as shown, is via the Coast Line Division of the Southern Pacific Railroad, which takes in all of the world's famous resorts of California, such as Santa Barbara, San Luis Obispo, Paso Robles Hot Springs, Del Monte, Monterey, Santa Cruz, Pacific Grove of Big Trees, San José, etc., arriving in San Francisco night of the 28th, thirty-six hours before our meeting convenes.

I will also state that the trains on which these special cars move will carry dining and observation cars, etc.; in fact, all features that go to make up the best there is to be had in train service.

Stopovers at any and all points desired will be allowed by the railroads, going and returning, within final limit of tickets, which will be three months from date of sale.

The New Orleans gateway is by far the most logical and convenient for a concentrating point of any in the Southeast, and I trust you will give this matter serious consideration, and arrange to join this party, so that we can all travel in one body.

On going trip, be sure and have your ticket routed via New Orleans and Southern Pacific Railroad to San Francisco. Returning, would suggest following lines, which can be secured for the same rate, namely, Southern Pacific to Ogden, D. & R. G. to Denver, up to Kansas City, Wabash to St. Louis, L. & N. to Nashville, thence any direct line to starting point.

The Southern Pacific line from San Francisco takes in the beautiful part of California known as the Lake Tahoe Region. Side trip can be made from Truckee, a main line point, through the Lake Regions, including boat trip of 75 miles around the Lakes, for \$5.00. Thence to Ogden, from which point side trip can be made through the Yellowstone National Park, consisting of round trip railroad fare, four nights' lodging,

Items of Interest

and thirteen meals while in the Park, at rate of \$53.50. Thence, return back to Salt Lake, where, after seeing the sights of this wonderful city, the D. & R. G. can be used to Colorado Springs, and at this point "Manitou," the "Garden of the Gods" and Pikes Peak are to be seen. Thence to Denver, at which point sight-seeing in and around the city, visiting the World's Famous Indian Congresses, etc. From Denver, would suggest Union Pacific Lines to Kansas City, Wabash R. R. to St. Louis, L. & N. to Nashville, thence any direct line from that point to original starting point.

The following are the rates applying from some of the most prominent points in the States of the Southeast for the trip as outlined above: also rate covering trip for those who may desire to take in Portland, Seattle, and the North Pacific Coast. Correspondingly low rates are offered by the railroads from all other points in this territory than those as enumerated:

Rates From	Via Direct Routes	Via North Pacific Coast
Atlanta, Ga.	\$71.90	\$95.00
Macon, Ga.	72.00	96.85
Augusta, Ga.	78.25	101.60
Savannah, Ga.	80.50	104.50
Chattanooga, Tenn.	66.95	88.40
Knoxville, Tenn.	72.55	91.00
Nashville, Tenn.	63.50	85.25
Memphis, Tenn.	57.50	81.20
Asheville, N. C.	79.05	97.50
Charlotte, N. C.	84.15	102.32
Raleigh, N. C.	87.95	106.12
Winston-Salem, N. C.	84.15	102.32
Spartanburg, S. C.	81.50	101.00
Charleston, S. C.	85.15	106.85
Columbia, S. C.	82.45	104.24
Greenville, S. C.	80.00	101.00
Birmingham, Ala.	63.50	88.40
Montgomery, Ala.	63.50	88.40
Mobile, Ala.	63.50	88.40
Jacksonville, Fla.	80.50	104.50
Tampa, Fla.	89.00	113.00
Palatka, Fla.	82.70	106.70
Columbus, Miss.	58.30	84.55
Greenwood Miss.	57.50	83.75
Meridian, Miss.	57.50	83.75
Hattiesburg, Miss.	57.50	83.75

Approximate charge for lower berth in Pullman sleeping car to make direct round trip, as outlined above, including stopovers at prominent points from New Orleans, would be \$32.00. The North Pacific Coast Tour, via Portland, etc., would be approximately \$42.00.

It will be my pleasure to see that you are furnished with any other

detailed information you may desire in regard to rates, tickets, limits, stopovers, side trips, etc., and you can either address letter to myself or to Mr. D. L. Griffin Agent, Southern Pacific Company, Atlanta, Ga., and such information as you desire will be furnished you promptly, together with literature pertaining to California, the Exposition, and Dental Congress. Either of us will make sleep car reservations for you on receipt of advice as to what is wanted in this respect.

Please let us hear from you, and oblige,

Yours truly,

Jos. E. EBY,

National Transportation Commissioner.

The Forsyth Dental Infirmary for Children. Permanent Staff Appointments.

An examination of graduates in dentistry (of less than three years' standing), for appointments to positions on the Permanent Staff for full and one-half time service, will be held on Monday, June 14th, at the Infirmary.

Appointments will be made for one or two years as follows:

Full time service, requiring every day from 9 A. M. to 5 P. M., with one afternoon off a week, at a salary of \$1,000 per year. One-half time service, requiring twenty-four hours per week, salary \$300; and will be made subject to satisfying the requirements of the Massachusetts State Board of Registration in Dentistry.

Members of this staff will be entitled to the advantages of reports and clinics by experts in the various branches of dentistry from different parts of the world, in addition to the numerous regular clinics.

All material and necessary operating instruments will be furnished; up-to-date apparatus, including electric engines, sterile instrument trays, fountain cuspidors, compressed air and modern operating-room-type lavatories are available for use.

A diploma of service will be issued to each member of this staff who has completed this term to the satisfaction of the Trustees.

Applications for the above positions should be made not later than June 10th to the Director, Harold DeW. Cross, D.M.D., 140 The Fenway, Boston, Mass., who will gladly furnish information to those interested.

Undergraduate Assistants.

During the months of June, July, August and September an opportunity is offered by the Trustees of the Forsyth Dental Infirmary for Children to a limited number of undergraduate students to act as assistants in the clinics of the Infirmary. This privilege permits a student to obtain unusual clinical advantages in the various departments of the institution where operative dentistry, orthodontia, nose and throat, oral

surgery, radiography, pathological diagnosis and research work are continually carried on.

Operators' gowns and all instruments are furnished. Over three hundred children are treated daily.

For further details apply before June 10th to the Director, Dr. Harold DeW. Cross, 140 The Fenway, Boston.

Northeastern Dental Association.

The Northeastern Dental Association will hold their twenty-first annual meeting in Springfield, Mass., on October 13, 14, 15, 1915.

DR. ALVIN A. HUNT, Secretary.

125 Trumbull St., Hartford, Conn.

The Florida State Dental Society.

The next annual meeting of the Florida State Dental Society will be held June 9, 10 and 11, 1915, at Pass-a-Grille, Fla. All ethical dentists are urged to attend.

ALICE P. BUTLER, Corresponding Secretary.

Gainesville, Fla.

Utah State Dental Society.

The Utah State Dental Society desires to entertain all dentists who visit Salt Lake or Ogden, and the undersigned would be very glad to be notified of the time of arrival of dentists either individually or collectively, in order that arrangements may be made for fraternal greetings and entertaining.

EARL G. VAN LAW, Chairman Entertainment Committee.
913-15 Walker Bank Bldg., Salt Lake City, Utah.

New Mexico Dental Society.

The New Mexico Dental Society will meet at Albuquerque, N. M., on Monday, August 23rd. All dentists who will be enroute to the National Dental, Panama-Pacific and the other meetings, are invited to stop with us a day, or longer.

DR. J. J. CLARKE, Secretary.
Artesia, N. M.

Wyoming Board of Dental Examiners.

The Wyoming Board of Dental Examiners will meet at Cheyenne, Wyo., in the Senate Chamber at the State Capitol, on the 29th and 30th of June and 1st day of July, 1915.



Society Announcements

The written examination consists of Anatomy, Physiology, Histology and Bacteriology, Chemistry and Metallurgy, Oral Surgery, Anaesthetics, Operative and Prosthetic Dentistry, Materia Medica and Therapeutics, Prophylactics and Orthodontia.

Applicants must present a full plaster model of upper and lower jaws of teeth, also one without teeth. Practical work will be required from all candidates taking the examination. The candidate is required to furnish his own operating instruments, dental engine, amalgam, gold, wax and modeling compound.

An examination is required of all applicants and only holders of diplomas from reputable dental colleges are eligible to such examination. The board does not interchange with other States, nor issue any temporary permits.

For further information and application blanks, address

PETER APPEL, JR., Secretary.

P. O. Box 643, Cheyenne, Wyo.

New Mexico Board of Dental Examiners.

The New Mexico Board of Dental Examiners will hold their next meeting at Sante Fe, commencing August 17, 1915.

Applicants must come prepared to do practical operations at the chair, must bring full denture models, for the articulation of and the carrying of full case to the point of vulcanizing, must have models for the making and articulation of a gold shell crown, and a bicuspid richmond crown. Anyone presenting without sufficient instruments and models will not be allowed to proceed with the practical work.

Further information and rules for examination will be furnished by the Secretary.

M. J. MORAN, Secretary.

Deming, New Mexico.

Indiana State Board of Dental Examiners.

The next meeting of the Indiana State Board of Dental Examiners will be held at the State House, Indianapolis, commencing June 14th and continuing six days.

For application blanks and full particulars address

DR. FRED J. PROW, Secretary.

Bloomington, Indiana.

Dental Commissioners of Connecticut.

The Dental Commissioners of the State of Connecticut hereby give notice that they will meet at Hartford, on Thursday, Friday and Saturday, June 17, 18 and 19, 1915, to examine applicants for license to practice dentistry. Application blanks, revised requirements, etc., will be mailed by the recorder upon request.

By order of the Commission.

EDWARD EBERLE, Recorder.

902 Main St., Hartford, Conn.

Idaho State Board of Dental Examiners.

The next meeting of the Idaho State Board of Dental Examiners will be held in Boise beginning Tuesday, July 6, 1915, at 9 A. M., at the State Capitol.

For application blanks and any information regarding the same address

ALBERT A. JESSUP, D.D.S., Secretary.

Box 1414, Boise, Idaho.

Delta Sigma Delta Fraternity.

The thirty-first annual meeting of the Supreme Chapter of Delta Sigma Delta Fraternity will be held in the Auditorium Bldg., San Francisco, Cal., Wednesday, September 1, 1915, at 10 A. M.

The regular order of business will be carried out, to be followed by initiatory exercises in the afternoon. The annual banquet will be held at the St. Francis Hotel, at 7 o'clock P. M. The headquarters of the Fraternity will be at the Hotel Clift.

By order of the Supreme Chapter.

BURTON LEE THORPE, Supreme Grand Master.

R. HAMILL D. SWING, Supreme Scribe.

North Dakota Board of Dental Examiners.

The next regular meeting of the North Dakota State Board of Dental Examiners will be held in the Armory at Fargo, N. Dak., beginning July 13, 1915. All applications must be in the hands of the Secretary by July 3rd.

For further particulars write,

F. A. BRICKER, Secretary.

Fargo, N. Dak.



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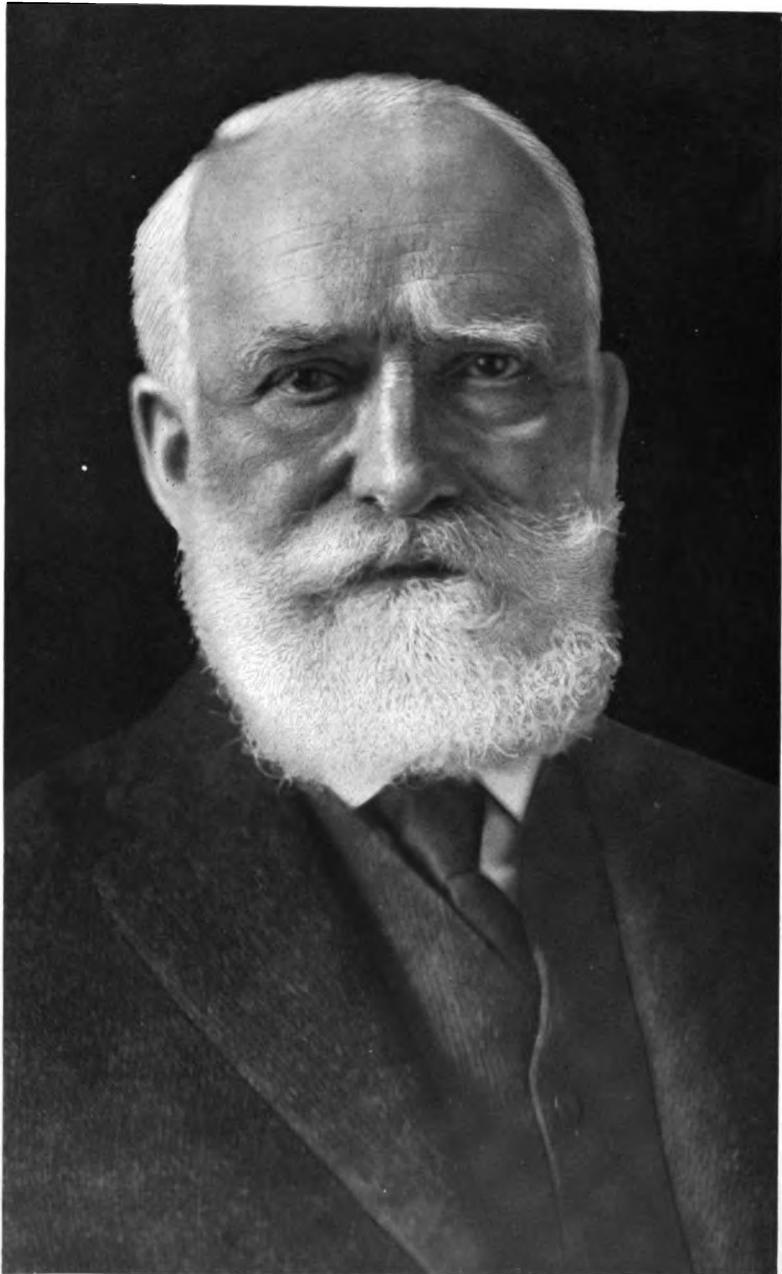
Subscription, \$1.00 per year, in advance, to United States, Mexico, Cuba, Panama and other American territorial possessions. Canada, \$1.40. Other countries, \$1.75. Single copies of this issue, 15 cents (Domestic).

Subscriptions received at any time, to date from January or July. Orders taken by all leading dental dealers. Advertising rates made known on application. Remittances preferred by registered letter, postal money order or bank draft.

Notification of change in address should be made on or before the 10th of the month, in order to have change made in time for the following month's issue.

Address all business communications to Consolidated Dental Mfg. Co., Publishers, Nos. 130, 132, 134 Washington Place; 187, 189, 191 West Fourth St., New York.

Communications for publication department should be addressed to the Editor, R. Ottolengui, M.D.S., D.D.S., LL.D., 80 West 40th St., New York.



FANEUIL DUNKIN WEISSE
Died June 22, 1915



The Rationale of Immediate Root Canal Filling.

By C. EDMUND KELLS, D.D.S., New Orleans, La.

Foreword. Readers—those who treat abscessed teeth by the endless chain method—those who are perfectly satisfied with their methods—those who never have any “trouble” with these teeth after they are filled—may better skip this paper, it being intended only for operators, who like the writer, do have occasional or semi-occasional trouble with root canal work.

This paper refers more especially to what are generally termed “blind abscesses”; though naturally the same rules of treatment, differing slightly in technique, apply to abscesses with sinuses.

In Fig. 1 is shown the skiagraph of a case from a class very frequently met with in the ordinary run of a dental practice. An upper lateral and a central had been “treated” and the root canals filled (?) about a year before, since which time these teeth have never been comfortable. There was a slight swelling over the central, and both teeth were sensitive to pressure. *There were no sinuses.*

Upon opening into these teeth and removing the root canal fillings blood and pus welled into the pulp chambers. They were filled by the



"immediate" method, whereupon the soreness at once began to lessen, and at the end of a week the conditions had apparently returned to normal.

The cause of this trouble was the condition of the contents of the bony canals within the teeth—nothing more—nothing less.

Please note the abscesses are within the alveolar process, and the cause of these abscesses is within the bony walls of the teeth, hence *without* the alveolar process.



Fig. 1.

Parenthetically, let us remark that the dentist has not yet been born who ever did or can cure an abscess. The best he ever did or can do is to remove the cause. Nature does the rest.

Such an abscess will probably be cured by nature if we remove the cause. The cause of the abscess—that is the contents of the root canal—can be immediately removed by:

1. Extracting the tooth, root canal, its contents and the whole outfit at one and the same time, whereupon nature proceeds at once (usually) to affect a cure, and,

2. Removing the refractory contents of the root canal only. Should this be done and the canal left empty, the canal will be refilled by capillary attraction with septic (?) material from the abscess beyond the apex of the root and thus the irritation will persist and the abscess continue.

But, and here is the crucial point, if after removing the cause by cleansing the canal (which usually can be done in a tooth of the character illustrated, well within the hour), and it is immediately antiseptically and hermetically filled with some non-absorbent and antiseptic filling material, the cause of the abscess has been as clearly removed as if the tooth had been extracted, re-infection of the canal is rendered impossible, and nature at once proceeds to take care of the infection (?) within the alveolar process, and a cure results.

The facts are that just such teeth can be filled in just this manner successfully; so we must adopt our theories to our clinical facts, and set to work to learn just why this is good practice.

Note the interrogation point after the words *septic* and *infection*, and for this reason. It is not possible to determine by any skiagraph whether or not the region is infected. The mere fact that pus is shown does not mean that it contains organisms, and without a bacteriological test it is absolutely impossible to determine its nature.

From the results observed from years of empirical root canal work, the writer concludes that some of these canals are infected and others are not infected, and when infected the number and virulence of the organisms may vary greatly in different abscesses. And this introduces a new conception of "things as they really are," resulting possibly to our great advantage.



Fig. 2.

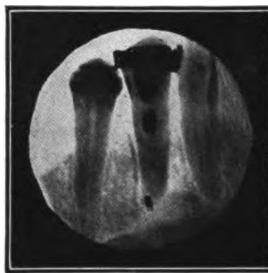


Fig. 3.

It is not suggested that the filling of root canals by the writer by either the immediate or by the endless chain methods give one hundred per cent. of successes. A small proportion of cases do give trouble and plenty of it, the after treatment in such cases not being within the province of this paper, but there is no larger percentage of trouble by this immediate procedure than by the method of more or less protracted treatment; in fact it is really believed to be less.

No more convincing argument can be offered to those who are willing to be convinced, for this immediate root filling proposition than the ordinary practice of replantation.

In Fig. 2 is shown a skiagraph of an abscessed lower cuspid which the writer failed to cure. The picture well shows the amount of alveolar structure involved. The tooth was extracted, its root put in condition and immediately replaced. No treatment was given the abscess in the alveolar process. Some of the pus naturally exuded in the process of irrigating the socket. No curetting was done. The abscess was cured by this immediate treatment and the tooth is O. K. at this writing, but it should be noted that an *antiseptic* method of replanting was used—no attempt at asepsis being made.

In Fig. 3 is shown the conditions obtaining at the end of this root several years later.

Such an abscess as that shown in Fig. 1 might be treated for weeks or until one tired, and if originally septic, might finally become sterilized, when at the last moment a little septic matter gotten into the canal during the operation of filling would start the whole trouble over.

The universal process of sterilizing a root canal is, I believe, to wrap cotton on a broach between the fingers and wipe out the root canal with it. Ye Gods! what a sterile process!

Where is the surgeon to-day, who after handling such bacteria laden objects as the levers of a dental chair, an engine handpiece, etc., would wrap root canal instruments taken from a bracket table, with cotton with his bare hand and swab out the abdominal cavity with it? Answer, buried. Patients buried, too.

Anyone who really believes he fills root canals *aseptically*, could possibly have his eyes opened if he would get a good bacteriologist to stand by some time and take a few cultures from his aseptic root canal dressings, filling material, broaches, etc., and from his hands as well, just as he is operating.

However should he prefer the contentment of living within the golden glow of his illusionary asepsis, then he may best not make the test.

The facts are that aseptic root canal work is not practical. Therefore, antiseptic work becomes imperative. Let us perfect ourselves along this line, treat root canals antiseptically and fill them antiseptically with antiseptic materials and the best results will be obtained.*

The writer deserves no credit for his ideas upon **Conclusion.** immediate root filling. He was taught this by Casius M. Richmond—he of the Richmond crown fame—many years ago, and has practised it satisfactorily and continuously ever since. A small proportion of teeth so treated do give trouble. Possibly, at this late day, the writer is now on the track of a slight change in technique which may decrease this proportion somewhat—he does not know—but he never expects to reach that state of perfection that one hundred per cent. of such cases treated in any manner will be successful.

Paste for Filling Root Canals.

By DR. W. I. PRIME, Laconia, N. H.

I never apply rubber dam for root canal treatment, but wash out canals at intervals with tepid water while cleansing with broaches.

*For opposite views on this subject see article by Dr. Elmer S. Best, in this issue, page 498.—EDITOR.



After canals are thoroughly cleansed and dried, I use the following paste as a root canal filling:

B Alum Exsic.,
Thymol,
Glycerol, $\text{aa. } 5\text{j.}$,
Zinc Oxid, q.s. to make stiff-paste.—M.*

Force this paste up to apex of root with Jiffy tube, or if canals are small, apply on smooth broach, after which take a hard cotton pellet and force entire contents up in canal by pressure, until patient experiences a sensation that the paste has reached apex.

In doubtful cases of abscess or putrescent pulp treatment, I use paper point dipped in phenol, changing this dressing every two or three days, until canal dressing has no bad odor, then fill canal as mentioned.

In pulp extirpation, under novocain suprarenin, after cleansing canals and drying thoroughly, I fill canals immediately with this paste. Seal in with Harvard cement and insert permanent filling. As this paste is a mummifier, should any fibers of nerve tissue remain in canal, they will be taken care of just as though entire pulp were mummified.

I have used this method for two years, and not one case has failed to my knowledge.

I have not described the details of canal treatment but the above is written with the understanding that in case of putrescent pulp all treatment previous to final sterilizing of canals with phenol had been done.

I never ream canals nor use formaldehyde in my office at all.

Criticism of a Mouth Hygiene Educational Film.

By REGINALD SAYRE, M.D., New York.

The present movement for instruction of school children as to the proper care of their teeth is most admirable, but in order that it may do good and not harm, the movies by which this information regarding the care of the teeth is to be spread broadcast throughout the country, should be prepared with intelligence.

At the recent meeting of the American Orthopedic Association, an education film was shown which first exhibited the various bacteria which are found in the human mouth, and described the damage which their transportation to various other parts of the body might cause. A skull was then shown whose teeth were cleaned with floss silk and a tooth brush in a very thorough manner by a young lady. A pecan nut, and

*See discussion of this topic in "Around the Table."—Ed.



later on a Brazil nut, were placed in the jaws of the skeleton, and by means of a dynamometer we were shown that a force of two hundred and fifty pounds was necessary to crack the nut. The young lady then demonstrated in her own mouth, the proper mode of cleaning the teeth and gums with silk and tooth brush, and then proceeded to crack a Brazil nut with her teeth, and eat it.

The logical inference to be drawn from this series of pictures, was, that if you kept your mouth clean and your teeth in good condition, you would be enabled to crack Brazil nuts requiring a force of two hundred and fifty pounds, with impunity, and if this film is shown about the country it will result in children subjecting their teeth to very abnormal and unwise strain.

I visited one of our large moving picture shows the other day, and in the "Topical Review" saw a class of school children going through the tooth brush drill, and I am very glad to say that they did not wind up the exercise by a nut cracking contest, and I presume that the majority of the films which are to be released all over the country in the near future, will not contain this objectionable feature, but as this film was shown to an audience of medical men, and we were informed that it was to be sent about the country for the purpose of instructing children what they should do with their teeth, it seems to me wise to raise a word of caution lest more harm than good be done by injudicious methods.

The strength of the teeth, and the bones, ligaments, and muscles, differs in various people, and because we occasionally find freaks in museums and circuses who can, apparently with impunity, bite pieces out of beer glasses and plates, and eat them up, and lift horses from the ground by their teeth, is no reason why the average person should subject the teeth to such unwise strain, and to suggest to children that they should do such absurd things as to crack nuts with their teeth, is extremely reprehensible, and should be stopped.



Oral Osteitis in its Relation to Arthritis.

By BYRON C. DARLING, A.B., M.D., New York.

Instructor in Orthopedics, College of Physicians and Surgeons, Columbia University; Roentgenologist, St. Vincent's and Ruptured and Crippled Hospitals.

Read before the Central Dental Association of Northern New Jersey, April 20, 1914, at Newark, New Jersey.

The need for exact diagnosis and the removal of the focus of infection as the first step toward the treatment of a particular condition, is becoming generally recognized by the medical profession. A study of the literature discloses active measures being carried on along this line in each branch of the profession. Rosenow, Billings, Haskins, Hastings, Camac, Joseph Collins, and others, each an authority in his particular field, have recently contributed valuable articles on the subject.

The *need* for exact diagnosis is generally admitted, but the hidden focus often baffles definite localization; and treatment, consequently, has been lacking in directness and efficiency. This paper is written from the angle obtained by the use of the X-ray. The field of the X-ray is constantly widening and its diagnostic value increasing as its technical perfection is increased and its findings assimilated and checked up.

Some of these hidden foci of infection, while not of a virulent nature, are often of a chronic and incapacitating character, and of most serious import. Their clinical manifestations, in the order of their importance, are, first, because more frequent, those of the chronic joints, single or multiple, usually progressive with periods of improvement, directly related to the increase or decrease of the resistance of the patient. That there is a great need for definite diagnosis in these cases is evidenced by a statement made recently by J. B. Murphy, that there had been no ad-

vance in the treatment of chronic joints in fifty years, the treatment being expectant and palliative. Next in order, shown notably by the work of Rosenow, are ulcers of the stomach and intestines, endocarditis, myocarditis, myositis, migraine, neuralgia, neuritis, and neurasthenia.

Much has been written by physicians and dentists upon the mouth as a source of infection in all of these conditions, and it is with this aspect of the value of the X-ray as a means of exact diagnosis that this paper chiefly deals.



Fig. 1.

The teeth fall between the province of the dentist and that of the physician, who seldom meet for co-operation in diagnosis. Whether the patient, child or adult, has ever had a dentist or not, the preponderance of possibilities points to the roots of the teeth, the gums, and the jaws, as harboring some focus of infection. The teeth being some thirty-two in number, having from one to three roots to the tooth with pulp in each, and the root socket about each root, it follows that any decay extending to and causing the death of the pulp or nerve becomes a source of infection which, if untreated, must result in a root abscess, osteitis, with or without fistulas (gum boils). (Figs. 1, 2, 4, 8 and 12.)

In the gums and alveolar process where Riggs' disease (pyorrhea alveolaris) is present, an X-ray examination is of the greatest importance, showing, as it does, the absorption of the aveolar process about the root, varying from an open space the width of a line between the tooth and the socket to that shown by a tooth loose in a bed of swollen and inflamed gum with disappearance of the adjacent bone (Figs. 3, 4 and 7). But more important is the demonstration of the root abscess cavities, early and minute or large with fistulas; and finally, the X-ray is a means of knowing whether a root has been completely and properly

filled to its apex by the dentist (Fig. 13). Wherever any suspicious condition of the mouth brings the teeth into question, the matter should be looked into thoroughly by both the physician and the dentist, leaving no hidden focus undiscovered. Frequently a patient will say: "I have been to the dentist and he says my teeth are in perfect condition"; and yet an X-ray examination will show definite lesions (Figs. 8 and 12).

To identify the invading germ and prove its derivation from these foci is a laboratory task beset with many difficulties; but the successful



Fig. 2.



Fig. 8.

work already done by Rosenow, Hartzell, Hastings, and others, supports the idea here emphasized.

**Diagnosis
of Infections
Diseases.**

The writer does not assert that the mouth is the sole source of infection in arthritic conditions, but is mindful of the many foci of infection from which virulent poisons may enter the system. In ascertaining certain other of these foci of infection, the X-ray is of equal diagnostic value. With no attempt at arrangement in order of importance, but rather to recall the various sources of infection and to advocate the necessity of making the search thorough—for any one case may be the sum total of several infections—a routine search may well begin at the head, first, in the respiratory tract: then the nose, throat and tonsils; middle ear and mastoid; accessory sinuses; glands of the neck; lungs, mediastinal glands. An X-ray examination is recognized by the otologist as of the greatest value in mastoid conditions, and by the

rhinologist as of considerable value in sinusitis. In lung conditions, it is the sole means of demonstrating the glands at the root of the lung, as well as supplementing greatly the physical examination of the lungs themselves.

Second in the order of search is the alimentary canal. In the stomach and duodenum, Rosenow has shown that the streptococcus viridans injected into the blood stream of animals will produce ulcers, which, theoretically, at least, may be located anywhere in the gastro-intestinal



Fig. 4.



Fig. 5.

tract. The X-ray in its possibilities for the localization of these menacing lesions is commanding attention.

In the recently rediscovered field of intestinal stasis, with its so-called auto-intoxication, the kinks and adhesions can often be demonstrated by the X-ray. This field is too new to be free from errors of judgment in interpretation, and it would seem as if the surgical procedures advocated are too capital, if not entirely wrong, and should be withheld, at least, until every other possible source of relief has been tried out and has failed. The possibility of auto-intoxication from retention of the stomach contents due to pyloric obstructions, duodenal kinks, atony of the musculature, or gastro-enteroptosis, can be shown by X-ray examination.

In cases of infected gall-bladder, for showing the presence of biliary calculi, the X-ray examination is becoming more and more dependable, showing gall-stones where they have sufficient calcium salts in their com-

position. Claims are being made recently for from fifty to seventy-four per cent. positive results (Pfahler).

In the genito-urinary system with its foci, such as abscesses in the kidney from calculi, or possible ulcerations from abrasions caused by



Fig. 6.

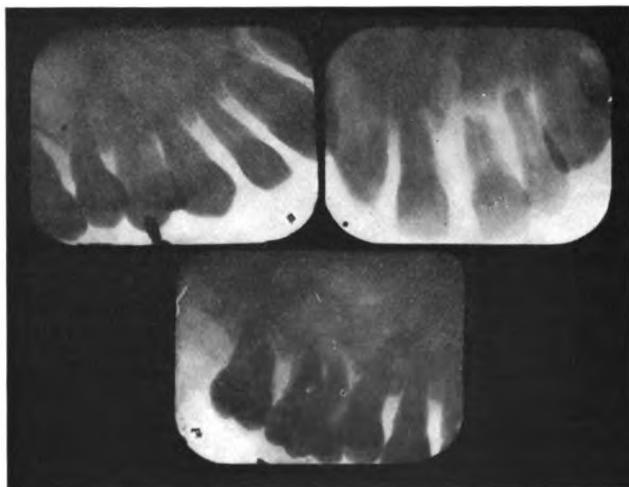


Fig. 7.

calculi in passage through the ureter, the X-ray findings are especially satisfactory. Following these as foci of infection are pyelitis, cystitis, urethritis, prostatitis, and seminal vesiculitis, in the diagnosis of which the urologist and bacteriologist have made great strides in recent years.

All these various foci of infection must be carefully considered in order to make an exact diagnosis, no one of them as yet having a monopoly as a focus of infection in arthritic conditions.

Items of Interest

Dr. K.; age 30; pyorrhea as yet uncomplicated.

Histories. (Fig. 6.)

Onset was insidious, with pain in one tooth and repeated abscess formation around it. Pain became general and four teeth which were loose were removed. Two more are still loose and will probably have to be removed. There has been no systemic or other local disease.

Mrs. A. S.; age 30; referred by Dr. H. A. Cossitt; pyorrhea complicated with stomach and intestinal trouble. (Fig. 7.)

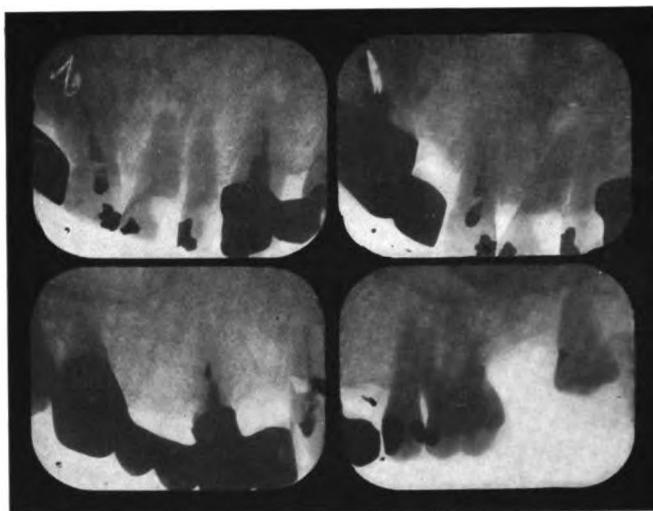


Fig. 8.

Stomach and intestinal trouble began at twenty-one years; has improved lately, after use of autogenous vaccines. No "rheumatism" has developed as yet.

Mr. X.; age 60; apical abscess and pyorrhea with years of chronic multiple arthritis. (Fig. 8.)

Patient has had chronic "rheumatism" of all his joints—hands, wrists, elbows, feet, spine, etc. X-ray examination of these joints shows evidence of spur formation, erosion of cartilage, and arthritis in different stages. For years patient has had a history of gum-boils and dead teeth, some of which are due to unscientific dentistry. Several other teeth show large cavities as a result of neglect and no dental treatment.

Mr. B. F. M.; referred by Dr. W. H. Haskin; apical cyst or abscess (Fig. 9).

Tooth causing the cyst was crowned seven years ago; left bicuspid,

eight years ago. Present condition began three months ago with hard painful swelling. There has been no other disease.

Mrs. C. E. T.; age 37; referred by Dr. W. H. Bates; apical abscesses and pyorrhea, optic atrophy, and blindness in one eye. (Fig. 10.)

For many years patient had much dentistry done, including many porcelain and gold crowns. August, 1913, patient had a bilious attack. About six weeks later an examination showed total blindness of one eye with no change in the optic nerve; but examination four months later



Fig. 9.

showed atrophy of the nerve. None of the lesions around the teeth had ever caused any pain.

Miss S. L.; age 22; referred by Dr. Virgil P. Gibney; apical alveolar abscesses and chronic arthritis. (Fig. 11.)

Patient was incapacitated for four years by left hip joint condition. For first seven months there was limping and pain in the joint when going up and down stairs, but very little pain when quiet. For the last two years patient has been confined to bed as a result of joint condition and of treatment with plaster cast. No other focus of infection could be found other than that in the teeth, the history of which antedates the joint condition.

Mrs. E. H.; age 50; referred by Dr. P. W. Roberts; pyorrhea and multiple arthritis. (Fig. 12.)

Patient had arthritis for seven years, beginning in the hand and extending to the wrists, elbows, shoulders, knees, and ankles. Right and



left elbows became partially ankylosed, and both knees completely ankylosed. Patient has had bad teeth since childhood, having lost all but six, which were removed about six weeks ago. Since then knees were straightened under ether, and all pain has now disappeared. Elbows and wrists are still painful. Patient walks but cannot rise from a chair.

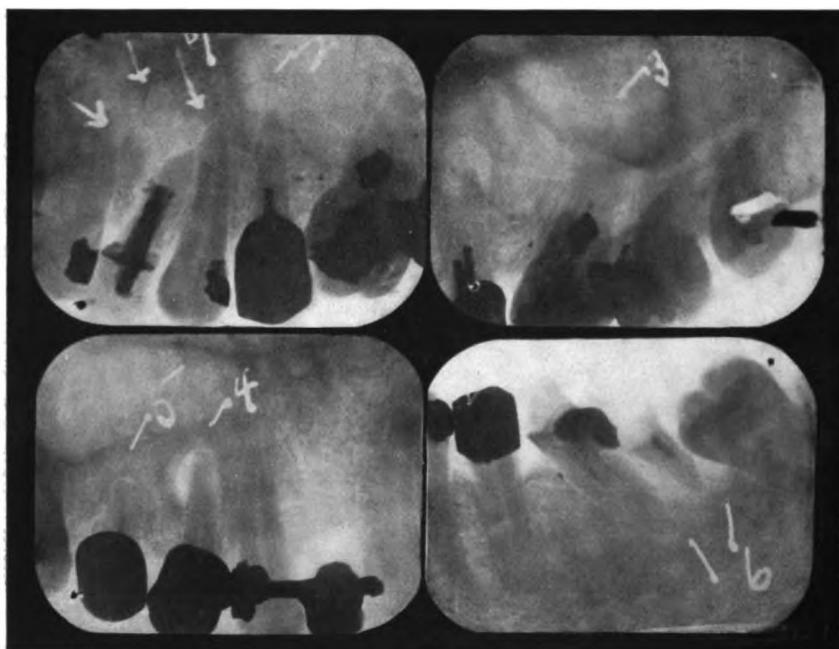


Fig. 10.

Conclusions.

1. As a first rather than as a last resort, special attention must be paid to the condition of the teeth. The hidden focus of infection may be either a blind or a fistulous alveolar abscess (osteitis).
2. Good health demands the constant close attention of a conscientious and scientific dentist.
3. Much old and unscientific dentistry, such as bad crown and bridgework and root fillings that are not scientific, must be removed, and the conditions remaining properly treated; failing this, merciless extraction and false teeth, but a clean mouth.
4. Pyorrhea alveolaris (Riggs' disease) is a menace to good health: it is a chronic ulcer of the gum and finally of the bone, and assuredly a focus of infection.

5. There should be co-operation with mutual recognition of responsibility between the physician and the dentist.

6. The search for the hidden focus of infection, while being very extensive and careful in the oral cavity, should not be confined to it but should extend over every possible seat of infection.

7. Even though the hidden focus be found and the cause of the systemic infection removed, the seed of the disease has already been



Fig. 11.

sown broadcast, and many expedients will be required before a recovery is effected.

In summing up, all mouth conditions should receive the most searching and scientific attention. It is of the greatest importance that there be established a clinical attitude which will insist that no treatment of these obscure diseases is complete without putting the teeth in order by dentistry that is beyond question.

I am indebted to Dr. Virgil P. Gibney for the privilege of showing X-ray examinations of the teeth of some of his private patients; to Dr. W. H. Haskin for the use of illustrations from his comprehensive collection of wet and dry specimens; and to Dr. R. Ottolengui, dentist and editor of the *ITEMS OF INTEREST*, for advice and encouragement.

Description of Illustrations.

Fig. 1. Dry specimen; 1 and 1a. Decay of cuspid. Infection extending to the apex produced large area of necrosis anterior to the antrum. 2. Alveolar absorption from pyorrhea. Other teeth likewise.

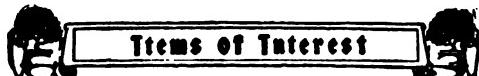


Fig. 2. Wet specimen; Lower jaw—snags or roots, a frequent source of apical osteitis. Upper jaw—extensive pyorrhea (Riggs' disease); note the receded ulcerated gum, due to disease and absorption of the alveolar process beneath.

Fig. 3. Dry specimen: Stripping of all the teeth from alveolar absorption, especially the molars, which have become loose foreign bodies. Compare with Fig. 2.



Fig. 12.

Fig. 4. Wet specimen: The extreme results of alveolar abscess which probably started by death of the pulp, followed by infection and caries of the alveolar bone.

Fig. 5. Wet specimen; Upper jaw—extreme recession of gums, due to absorption of the alveolar process from beneath, probably from pyorrhea. Lower jaw—old snags; neglected roots a more frequent cause of apical disease than unscientific root treatment by the dentist.

Fig. 6. Radiograph shows infection and bone destruction all around the cuspid tooth, and is a very good example from life of what must have occurred around, let us say, the molar in Fig. 2. This apparently was due to a dead pulp which has not been removed by the dentist.

In Fig. 7 there is the same condition together with resorption of the ends of two roots in the upper right hand picture. In the left hand picture there is probably some pyorrhea and loss of bone between the teeth. The same is probably true in the picture below.

Fig. 8. In the upper left hand picture there is an abscess at the end of the root, probably due to faulty root filling. In the upper right picture there seems to be an abscess at the end of the root due to death of the pulp and lack of treatment. In the lower right hand picture there is another example of faulty root canal work.

In Fig. 9, upper left, an abscess on a crowned tooth probably due to faulty dental work. In the right upper picture, a large abscess probably

due to faulty dental work with possibly a piercing of the side of the root during the work. The left lower picture is the same tooth; here we see the metal post protruding through the end of the root.

In Fig. 10, upper left, there are abscesses over teeth in which there are faulty root fillings; same in the upper right; ditto lower left and lower right. In the lower right there is a large abscess at the end of a tooth which carries a crown, probably due to the death of the pulp after the tooth was crowned. This is one reason why the best men insist that

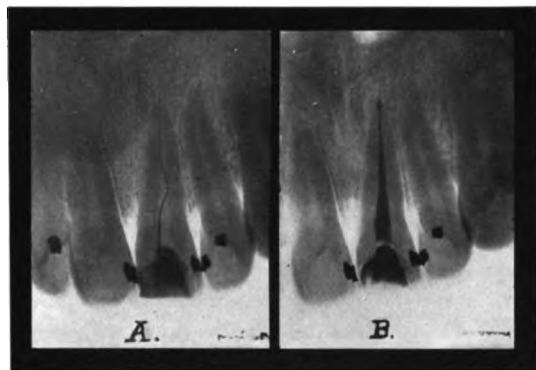


Fig. 18.

all teeth which are to be crowned should have the pulps removed and the roots properly filled first.

In Fig. 11, above, two films of same teeth—there is an abscess at the end of both the bicuspids due to faulty root canal work in the first, and entire neglect in the second. The molars show long, food collecting crowns.

Fig. 12. Shows infection around roots which have been left in the mouth and stripping of the alveolar process from pyorrhoea alveolaris. All the teeth are affected.

Fig. 13. Radiographs illustrating scientific treatment. A. Tooth with wire in root, showing that canal has been cleansed to the end. B. Same tooth showing root filled to the end. (Operation and radiographs by Dr. R. Ottolengui.)

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The Responsibility of the Dentist in the Care of Pulpless Teeth.

By ELMER S. BEST, D.D.S., Minneapolis, Minn.

Read before the Second District Dental Society, April, 1915.

During the nineteenth century, Lister, Bassi, Semmelweis, Jules Lemaire and Battini advocated the use of antiseptics for the purpose of overcoming wound infection after operations. It was the proof that suppuration of wounds was the result of microbial infection which made the great turning point in the history of surgery in 1880.

Cleanliness alone, and the use of antiseptics in the wounds alone were tried, and have been tried since the Listerian method, but they have always failed.

Asepsis as it is at present understood and practiced indicates a condition of absolute sterility, the result of mechanical cleansing, antiseptics, or heat, or all three. An aseptic operation therefore, means one in which all the instruments, sutures, ligatures, dressings, field of operation, the surgeon's hands and everything, in fact, coming in direct or indirect contact with the wound have been thoroughly sterilized and in which no antiseptic solutions are used during the progress of the operation.

The ideal operation of to-day is an aseptic and not an antiseptic one. A small volume published by Hunter Robb in 1894 and another by Carl Beck in 1895, dealing with aseptic surgical technic, put this subject in a comprehensive light before the American profession, and it has grown in popularity and practice ever since. It is extremely doubtful whether, even in infected wounds, strong antiseptic solutions exercise the retarding effect on the infection that was once supposed.

Source of Wound Infection. By far the most common source of wound infection is the hands of the surgeon and his assistants. The patients skin may also be the source of infection. Infected sutures, ligatures, instruments and dressings are frequent sources of infection, but we should not fall into the habit of attributing our infections to these until we have absolutely ruled out all possibility of infection having arisen from our own hands or those of our assistants or nurses. The saliva is also a source of infection.

Methods of Overcoming Wound Infection. In the modern aseptic operating room, germicides and antiseptics do not play so important a part as they formerly did. This is largely due to the fact that heat is used whenever possible in the preparation of sutures, instruments, dressings, etc., and to the fact that in uninfected tissues no antiseptic solutions are employed. It must also be remembered that germicidal agents possess the disadvantage or exercising a more or less destructive action on body cells and consequently their use is not warranted in clean wounds.

This brief account, gentlemen, tells us the crisis through which surgery has passed. The dentists have now reached their crisis and are to-day passing through the most revolutionary epoch in the history of dentistry.

The reason for this is that the pulp canal operation, which in the past has been considered a comparatively simple and unimportant one, to-day stands charged by the thinking members of the medical and dental professions as the cause of as much, if not more, suffering than any other operation. The reckless manner in which we have been removing pulps from the teeth of our patients with hardly a thought of the almost certain infection which follows the ignoring of surgical cleanliness, and replacing them with artificial substitutes, most certainly shows that we have had no adequate conception of our responsibility in handling these cases.

Dr. W. A. Price, in discussing this subject recently said: "What is the cost of failure? The estimate of the past has been a tooth; the estimate of the hour is possibly years of suffering, possibly a human life."



Those who co-operate with the physicians in focal infection cases realize this to be the real situation. Our responsibility is increasing by leaps and bounds and a fuller realization of this is brought home to us by reading papers which were presented by Gilmer, Billings, Mayo, Rosenow and Craig at the last meeting of the American Medical Association.

From the fact that human lives are unquestionably being saved by the extraction of pulpless teeth, which represented what we considered all that was possible in pulp surgery, it would appear that we have had an entirely wrong conception of just to what extent nature's ability reaches in shouldering the responsibility which we have been shifting to her shoulders.

I do not believe that it is possible for any dentist to make an ideal operation of every case that comes into his hands, any more than it is possible for a surgeon to make an ideal operation of every case he handles.

We have and always will have human error to contend with, as well as mechanical obstacles of varying degrees of difficulty to overcome, but to my mind the principle trouble in the past has been that these two things have been very greatly exaggerated. The skilled surgeon has a high percentage of successes, but he also has his failures. This is not said with the idea of excusing anyone who is so mentally and physically lazy that he will not exert himself to do the utmost of all that lies within his power, but it is a plain statement of human efficiency.

It would appear at present that about ten per cent. of the teeth present conditions which render the removal of pulp tissue and the placing of an artificial substitute very uncertain if not impossible.

Removal of Pulps.

I can not imagine that the tooth pulp was ever intended to be removed in wholesale fashion, but we were supposed to keep it as long as we kept the tooth; for unquestionably a tooth that has its pulp in good health is a better unit of the masticatory apparatus than one which is pulpless. So I think it is wise to follow the plan of never removing a pulp if it is possible to save it with an assurance of future health and comfort to the patient.

We have for years hoped for some attachment for bridgework that could be universally adopted for use on vital teeth and which could be so constructed that it would not in any way endanger the vitality of the pulp. Over twenty years ago Dr. Carmichael introduced his three-quarter crown, which so far as the conservation of tooth structure in preparation for abutments is concerned, has not been improved upon. Yet you all know the existing possibility of pulps dying under large metal restorations. This was proven recently when I had my attention drawn



Society Papers

to a beautiful piece of bridgework which had been placed upon two vital teeth, the pulps of which had died, and the resulting infection was so extensive that both teeth had to be extracted.

While it is true that we have had almost unlimited amount of trouble from pulpless teeth where our operation has been a failure, yet I am firmly of the belief that our salvation lies in perfecting this operation where it is indicated, and in incorporating with it the maintenance of asepsis instead of changing over into a field that is most certainly not free from danger even when handled by the most skillful and mechanical dentists.

When a tooth has had its pulp removed in a surgically clean manner and the opening guided by radiographs, and then the canals filled to the foramina in a sensible manner, I most emphatically contend that a great error is being committed if we denounce such a tooth with assurance as a future focus of infection. Especially is this true when we have radiographs showing good pulp canal operations, few though they may be, which have been performed in years gone by, in such a manner as to preserve the apical tissue, and when at the same time we found in these same mouths other pulpless teeth which contained very indifferent operations which, upon bacteriological examination, are proven to have infected periapical areas, associated with extensive bone destruction.

In his latest book on dental histology, Dr. F. B. Noyes draws attention to the rich blood supply of the periodontal membrane, and Dr. G. V. Black, in a personal communication, says that such blood supply would not be affected by pulp removal. As to the formation of scar tissue resulting from a wound caused by the severing of the pulp at the foramen and the consequent formation of an area of lowered resistance, I have never seen any proof offered that such is the resulting condition. We are not justified in assuming that it inevitably follows for as Adami says: "It is or used to be taught that every wound must leave its scar, but, as every man who shaves knows, this is not the case. Of late we performed an autopsy on a case in which a laparotomy had been performed within three months in which close examination externally failed to detect the operation wound, while internally it was only indicated by omental adhesions and absence of important pelvic viscera."

Dr. Rhein has done much interesting work along the line of ionic medication. This and other published work along this line makes very profitable and interesting study and its application is very gratifying.

**Root Canal
Fillings.**

The dental profession to-day stands challenged by both the medical profession and the laity on account of this hidden work which we have been doing. I do not say this in any spirit of censure, for in

years gone by we did the best we could and purposely or otherwise tried to shut our eyes to the consequences. But we should be happy to say that the standards of the past are not those of the present nor the future, and we are now doing vastly different work along this line from what we did formerly; at least, those who are using radiographs in checking up their operations.

An examination of two hundred and eighty-eight cases of pulpless teeth showed the following conditions:

Mechanically defective operations with rarefied periapical areas, one hundred and seventy-seven.

Mechanically defective operations without rarefied periapical areas, forty-one.

Infected areas from gangrenous pulps, forty-four.

Mechanically perfect canal operations, fifteen.

Mechanically perfect canal operations, showing rarefaction, one.

Vital tissue under canal filling, seven.

Infected areas over vital teeth, two.

Arsenical necrosis, one.

Bear in mind that the loss of bone around a root apex, as it is revealed to us by the radiograph, most emphatically does not mean that this condition followed the operation in the root, but may have preceded it, and while we say that seventy-eight per cent. of imperfectly filled roots carry with them periapical irritation, shown radiographically, we are not stating that one is necessarily the sequel of the other. We do not see how anyone can feel justified in making positive statements regarding abscesses resulting from pulp surgery, unless he is prepared to offer a detailed statement of each individual case, substantiated by radiographs before and after the operation, as well as bacteriological reports. To put this in concrete form, we must consider those cases where previous to our filling the roots we have had a gangrenous pulp to deal with, and also those cases where, from the use of arsenic or other drugs, there is apical irritation resulting in granuloma.

It used to be generally conceded that about ten per cent. of our old pulp canal operations had fillings reaching the apical region, and in some of those which did reach the apex we found shreds of non-vital pulp tissue lying alongside of the canal filling, and were able to recover pyogenic bacteria from this material. Heaven knows the condition is bad enough, but why condemn the whole operation on such a showing? Where were the medical profession before they found adequate means of preventing infection during their operation? We have not done the spectacular things they have done in handling the lives of their patients, but occupy the same old boat they did, and when it starts to sink with us

as it did with them, we are forced to save ourselves. When the dental profession as a whole learn how to prevent the infecting of their patients, then and only then can they lay claim to an appreciation of the difference between antisepsics and asepsis in pulp surgery and pulp canal filling.

The mere fact of not getting a canal filling to the apex is not the whole offense, although it is a most serious one. In the course of our operation we may, by our carelessness, introduce infection into the canal and carry it into the periapical space, or leave it in the canal in contact with non-vital tissue; thereby quite easily establishing a very nice little focus of infection which may later be the cause of most serious trouble.

It would seem that there is the same relative proportion between the number of cases infected during this operation and the number which the surgeon infects, as the difference between the precautions the surgeon takes and those taken by the majority of dentists. I will leave it to you whether or not we are reaping a just harvest for what we have sown. The offense seems all the greater when we consider the comparative simplicity of providing a means of doing the operation in an aseptic manner.

No longer can it be said that simply because we do not have the symptoms of acute septic pericementitis or the establishment of the fistula, that that particular tooth is not giving the patient very great trouble, or is not rapidly becoming the seat of a very serious trouble later on. The evidence which we observe upon looking into the mouth is sometimes the weakest evidence which we can get, for we see nothing below the surface, and it is that part of the tooth which is the most prolific source of trouble.

**Relation of
Dentist to
Physician.**

We sometimes criticize the physicians for making a diagnosis of certain conditions which he finds in the mouth, and yet my experience has been that the physician is only too willing to turn over to the dentist everything which lies within his sphere, pro-

vided he can handle it in consideration of the patient's best interests. The question has been raised by a number of my medical friends that the dentist interested in the case adopts a very peculiar attitude towards cases of focal infection, where it is suspected that the focus is in the jaws, and more especially in those cases where an infection may have developed under some restoration which he has placed in the patient's mouth.

In other words, their real interest is about on a par with the interest a man has in a case of orthodontia when he takes impressions and sends the case into a laboratory with a request to construct an appliance for it. The poor laboratory man is up against a proposition which may be

almost an impossible one, for even if he does know something about the work he is under the handicap of never having seen the patient. Let our relations with the physicians be of the most harmonious nature and by our co-operation we can render our patients more valuable service.

The dental profession never has had such an opportunity as at the present time for doing something really worth while for humanity and I am confident they intend to take full advantage of the opportunity. To me, it is the greatest comfort when cases are referred by physicians to be able to make an exhaustive search of the teeth and jaws, first with plates, and then to check up the suspicious areas with films, then testing the teeth for vitality with the faradic current, thereby locating the teeth which may possibly have non-vital pulps, but which show no apical disturbances in the radiograph.

There is nothing I know of, in my relation with the members of the medical profession, that compares with the satisfaction derived from co-operative work in making these examinations, as they are only too happy to have us assume the responsibility of this part of the work as they realize that it is distinctly within the dentist's field.

While this work is most fascinating yet it requires a most careful preparation and familiarity with the anatomy of the teeth and jaws and adjacent parts, for advice on this subject must be dependable when one enters the field as a consultant; otherwise the advice only results in confusion and uncertainty.

At this point I wish to draw your attention to certain conditions which occasionally are found in X-ray work. There are certain cases where, owing to exostosis, we are unable to get a clear, sharp outline of the roots of the teeth and we must remember that this somewhat blurred image in the film is the true representation of the actual conditions which exist.

**Sources of Infection
of Apical Area.**

We will now consider for a few moments the various sources of infection in the roots of teeth and the periapical areas.

Class 1.

From saliva, unclean instruments, cotton, chip blowers, canal points, unclean hands.

Class 2.

Bacteria as a thrombus lodging in blood vessels of pulp, causing interruption in the blood supply and an area of lowered resistance favorable to the proliferation of bacteria in thrombus.

Class 3.

Pulp tissue having become non-vital as a result of trauma or the use of arsenic may become the seat of infection owing to the growth of bacteria which were in the circulatory system at the time of its death or later.



Fig. 1. Small dressing sterilizer.

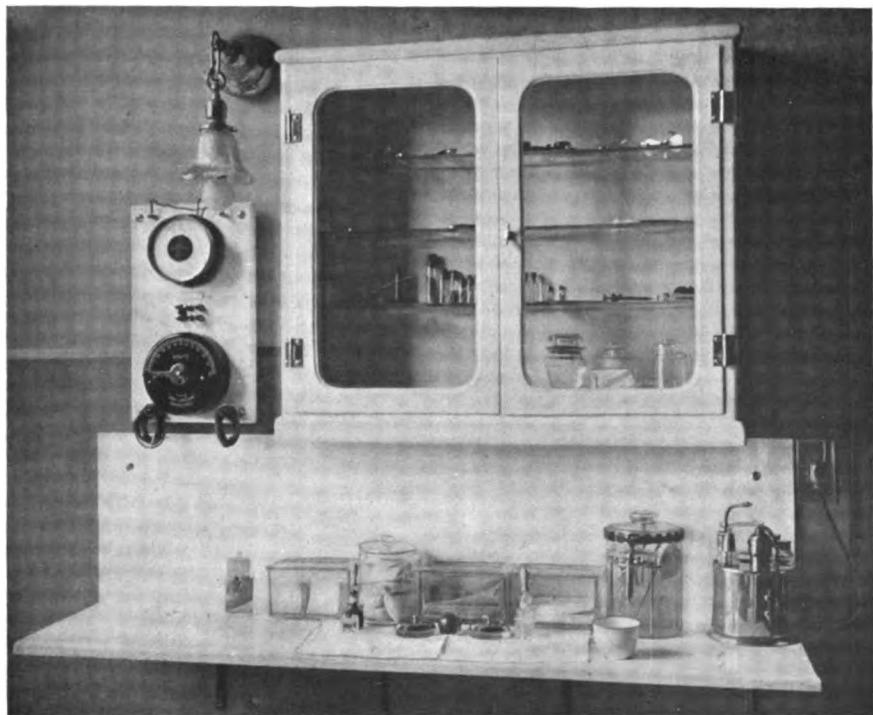


Fig. 2. Glass jars containing sterilized cotton gauze, dressing bristles, etc., waste dressing cup, medicine bottles, hypodermic outfit.



Removal of all the pulp tissue and the failure

Class 4. to fill the root to the apex leaving a space in the root apex where bacteria may proliferate away from the immunizing mechanism or action of the phagocytes. The bacteria may become lodged in this area, escaping from the general circulation,

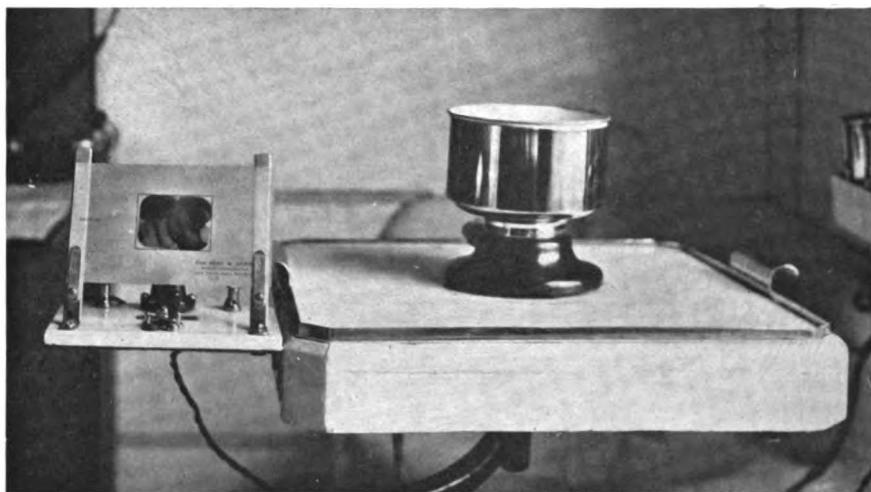


Fig. 8. Bur and broach sterilizer.

where they were in existence as the result of a general invasion, such as an attack of Grippe, or a focus of infection somewhere else in the body.

Destruction of periapical tissue from drugs such

Class 5. as arsenic or formalin used as treatment and dressings in pulp canals, causing an area of lowered re-

sistance by causing an actual destruction of the attachment of the peridental membrane, leaving denuded cementum which maintains chronic focus indefinitely, which would be favorable to the proliferation of bacteria either introduced through the canal or from the general circulation.

An examination of twenty-six cases of chip blowers and used barbed broaches revealed—fifteen cases producing pyogenic organisms.

Twelve tests of cotton in cotton holders in common use showed—nine cases of pyogenic organisms.

Nine cases of sterile cotton handled by unclean hands showed—seven cases to be infected.

In our experiments we found that nine cases where periapical infection existed and where the pulp was infected that we found the same germ.

We also found that in twelve cases these pyogenic bacteria were in

existence in pulp canals which contained non-vital tissue and we found in seven cases so-called germicidal pastes or preparations.

Six cases of infected canals showed no apical disturbances.

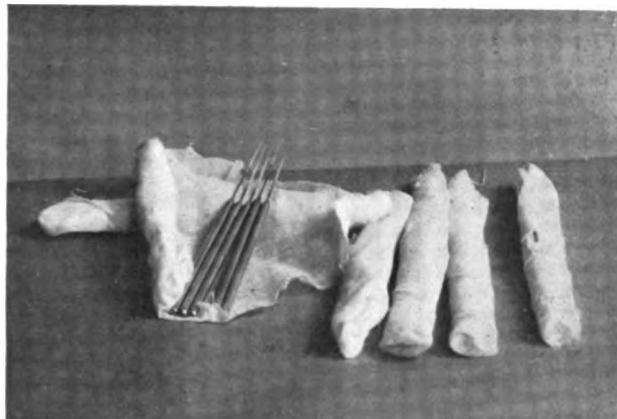


Fig. 4. Dressing bristles.

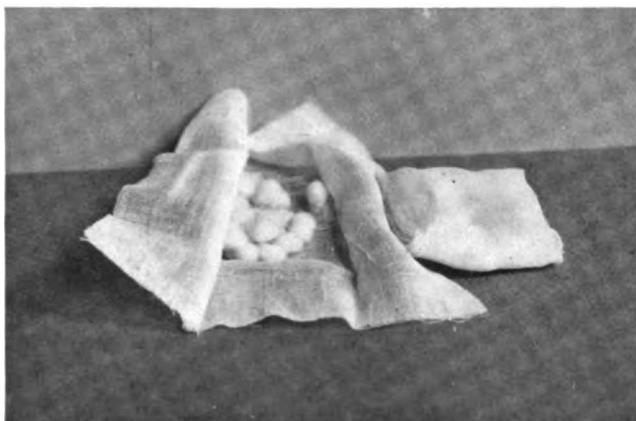


Fig. 5. Sterile cotton pellets.

Now we have traced the source of a great deal of this infection and this, together with the admitted fact that with rest and care serious cases of focal infection recover upon the removal of teeth, which in the radiograph show areas of rarefaction, seems to be strong evidence that periapical infections associated with pulpless teeth are of, or associated with, primary origin, and are under the control of the operator doing the operation. Our conclusions in this regard are the same as those of

Burchard and Inglis. In only one case did we find apical infection where no growth could be secured from the pulp canal. In this case, which was a focal infection case, the roots were filled to the apex with oxy-chloride of zinc cement. One other showed great bone destruction but no growth could be secured either from the tooth or socket.

In handling this subject it is with full realization that it is in the most dangerous field that the dental world offers for discussion and

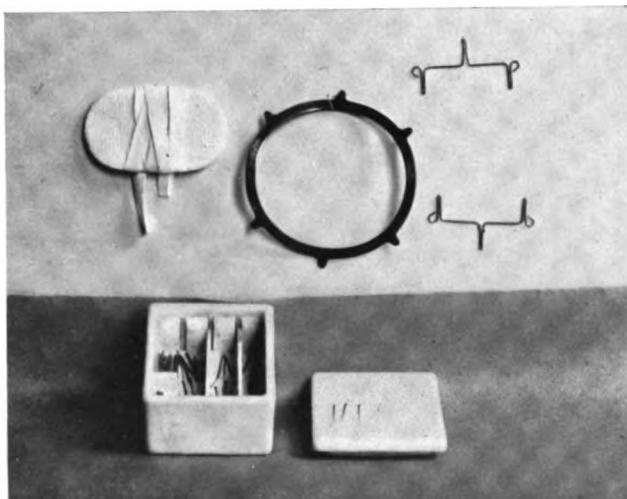


Fig. 6. Rubber dam holders. Gutta percha canal points.

writing, and that there is such a difference of opinion that it is almost impossible to agree on many points in the work. Yet it is as an earnest seeker after the truth that I present my ideas for your consideration to-night.

**Root Canal
Pastes.**

I shall venture an expression of opinion on the so-called germicidal preparations with which the market is simply flooded to-day. It is always with a sense of shame for my profession that I see the extensive use of these preparations which the manufacturers unload upon unsuspecting purchasers in such a shameless manner, and which they in turn unload upon a more unsuspecting and more confiding clientèle. The latter case is worse than the former as in the first case only material is purchased, but in the latter services are sold. The only possible excuse I can see for the use of these preparations in the roots of teeth is that the operator knows he has left something in the root which he should not have left, and instead of removing it he places his "life saver" in on

top of it and then he is quite sure he has "no trouble from it" in the future.

The only solution lies in an almost entire non-dependence upon anti-septics in canal fillings and in the maintaining of asepsis in the operation.* This leads me to the query: "What right have we to leave in the human body any substance which requires that we also seal in contact

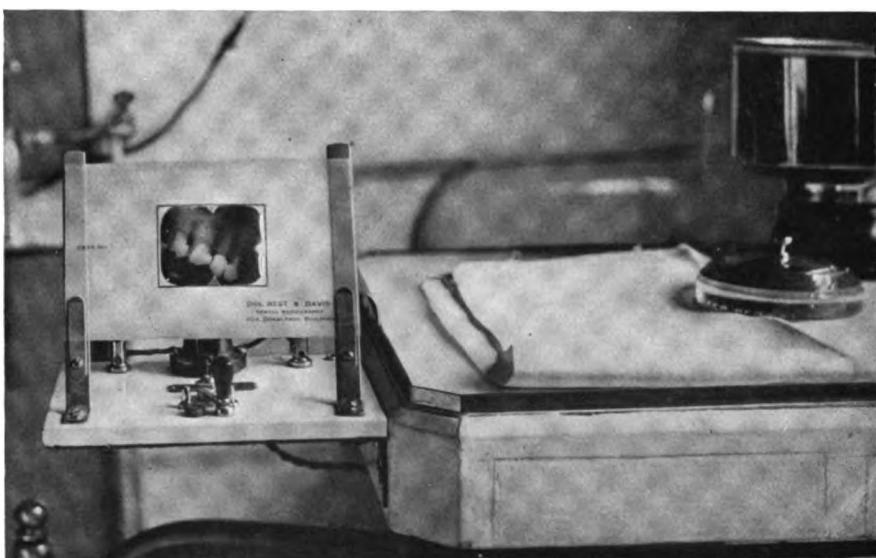


Fig. 7. Illuminator.

with it a germicide to control the action of bacteria which we fear may be present?" Prinz and Buckley have drawn our attention to the fact that there is no such thing as a permanent germicide which we can seal in a tooth, and our experience in examining thirty cases shows that in every case where non-vital tissue was present bacteria existed regardless of the preparation that had been sealed in the tooth.

Before discussing the technic of this operation let us for a moment consider some of the instruments and equipment necessary for this work.

**Apparatus
and Instruments
Used in Root Work.** First we must have a good sterilizer, for much of our equipment must be boiled before and after each operation. Then comes the dressing sterilizer for the sterilization of the cotton canal points, the dressing bristles, gauze pledges, cotton pellets, napkins, gauze sponges, etc. (Figs. 1 and 2). Then we have a small bur

*For opposite views on this subject see article by Dr. C. Edmund Kells in this issue, page 481.

Items of Interest

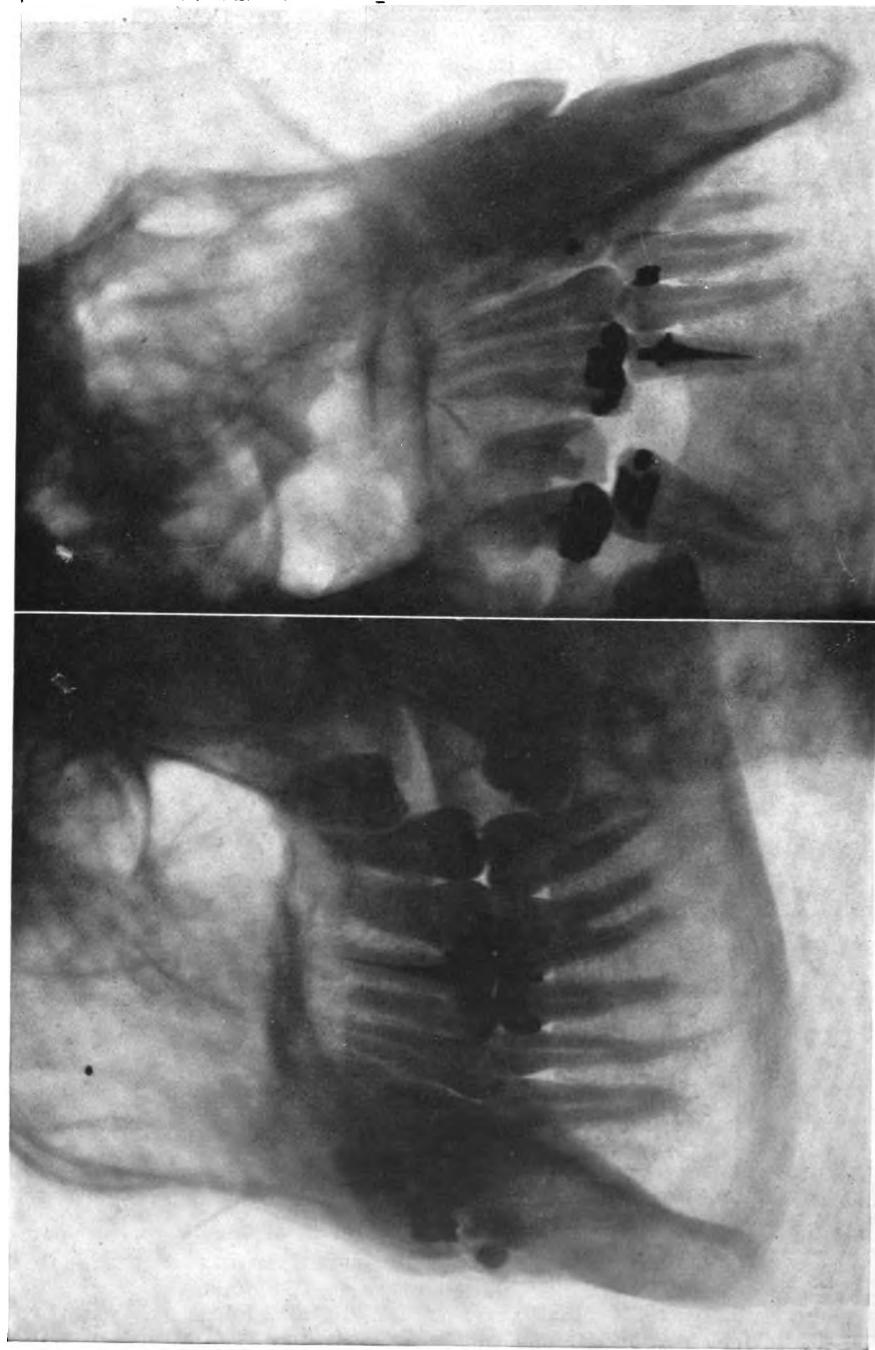


Fig. 8.

Case I.

Fig. 9.

and broach sterilizer. Dr. Otteson of Christiana, Norway, who was in this country recently, gave me the idea for this little outfit, and though I could not get the one which he was using, I made up one which suits me so well that I could not get along without it. I selected a four-inch electric stove and placed around it a two-inch brass collar. Inside the collar was placed a four-inch porcelain cup. When the brass collar was



Fig. 11.



Fig. 10.

Case II.



Fig. 12.

nickel plated it made quite an attractive little outfit, and being small it can occupy a place on the bracket (Fig. 3).

The dressing bristles, of which one should have three or four dozen, are made of metal which will not rust and are set in aluminum handles. The bristles are wrapped with cotton and in lots of six are placed in a wrapper made of linen, each lot being separately wrapped in a six-inch square of gauze (Fig. 4). The cotton canal points are folded up in lots of six in the same style of gauze, also the cotton pellets, which can be purchased in quantities already rolled, are made up in small packages of from twelve to twenty pellets in a package (Fig. 5). Then we have the gauze pledges which are six by six pieces of gauze, folded with one corner turned back.

**Aseptic Root
Operation
Described.**

Now we will commence to operate, and keep in mind, if you will, that we will now attempt to do something which has been considered by many rather impracticable in the past, and that is an aseptic pulp canal operation. Spray the mouth, paint the gums in the region of the operation with iodine, being careful to have the gums

dry before applying it. Now adjust the rubber dam with a rubber dam holder which can be sterilized (Fig. 6). When adjusted, paint the teeth included and the dam surrounding the teeth with iodine, then alcohol.

We will assume that we are operating on a tooth that has a large cavity and the pulp is so involved that it can not be saved. We have injected our anesthetic and will work without having to contend with



Fig. 18. Case III.

pieces of vital tissue in the canals which has proven annoying on so many occasions. Carefully remove all the decay and sterilize the cavity with iodine. With a pulp chamber bur, which has just been taken from our bur and broach sterilizer, we open the pulp chamber, freely exposing to full view and access all the canals.

Now we will select what we consider a difficult canal to open. Take a very fine smooth bristle and gently force it into the canal; very gently and patiently work it along the canal toward the apex. If it buckles or turns on itself try another, and yet another, and if they fail, try an extra fine spiral broach which is much more rigid. With either one or the other we can, in most cases, reach the apex, and if we can the success of the mechanical part of our operation is almost certain, for we now operate from the apex back.

We are now operating with a radiograph of the case on our bracket

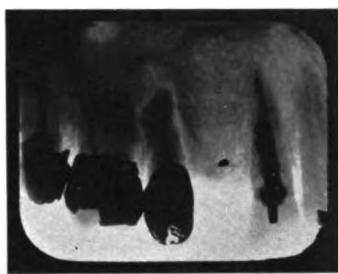


Fig. 14.



Fig. 15.

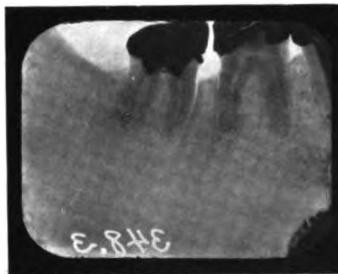


Fig. 16.



Fig. 17.

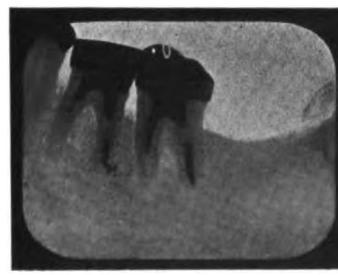


Fig. 18.



Fig. 19.

Case III. Checked up with small films.

in a small illuminator (Fig. 7), and know approximately the length of the root. When we have reached approximately the apex with the bristle and it is a very tight canal, we place a small drop of fifty per cent. sulfuric acid on the bristle, and by moving the handle in a sweeping motion we carry the acid to the end of the bristle and push back the walls of the canal. This is continued until the bristle moves back and forth easily in the canal. It is now removed and bicarbonate of soda introduced. When the reaction has subsided the moisture is absorbed as well as possible and a spiral broach is introduced. This is worked into the canal and each time it is turned in the direction of its thread it must be pulled back. This accomplishes two things: it prevents the instrument from becoming wedged and breaking off in the canal, and also is the means of cutting down the walls. This process is kept up until we near the apex, when we substitute the files which are somewhat similar to the spiral broaches, but have a much closer spiral and have a sharp cutting edge, which is turned out so that when the instrument is placed in the canal and drawn out it cuts down the wall of the canal. We keep increasing the size of the instrument until we have the canal sufficiently enlarged, when we place a sterile measurement wire in the canal and bend it through a groove which we have cut in the margin of the cavity over the opening into the canal, seal the tooth and have it rayed.

When the film is ready, which is about the time it takes the patient to get back to the chair and have the rubber dam adjusted, we remove the measurement wire and place it on the film to see if there is any distortion. If not, we note on the patient's chart the exact length of the root. This is for future reference in case a post is inserted for bridge abutment. In case we have not reached the apex sodium-potassium may also be used on a very fine broach and an effort made to penetrate farther. Get as far as possible with this and then use sulfuric acid as suggested by Dr. Callahan. I have recently found a sulfuric paste which can be carried into a canal on a broach almost as readily as the sodium-potassium. If it is a curved canal we must depend upon our ability to work around the curve with a bristle and the chemical or cut back the walls of the canal as Drs. Callahan and Rhein have suggested, then continuing into the canal. If it is a straight root we can also make excellent progress with a set of instruments, which I think are without a name as I understand there are only a few in existence.

It is one of the most ingenious devices I have ever seen. It consists of a set of drills, which come in dozen lots and which fit into a small mandrel for the hand piece and also the right angle. It is about the only drill I have ever seen that I could feel any degree of comfort in using in the canal when using the engine. If it is considered advisable

not to use the engine, which I think is generally the case, we have a handle which is quite heavy and affords a good grip. The small mandrels fit into this handle and we can use them in this way. The little drills are so constructed that they have one weak point, and before they will stand enough pressure to break near the apex they will come apart where they enter the mandrel. The Downie and Kerr reamers, of course, have their place at this stage of the operation.

Now we assume that we have at last reached the apex. The case is again rayed with measurement wire, and we are now ready for the filling of the canals. This I am now doing as has been advocated by Dr. Callahan, to whom so much credit is due for the work he has done in this line. And when I say this, I cannot do so without at the same time paying a tribute to the men here in New York.

Our solution of chloroform and rosin is placed in the canal and a cone selected from its bath of alcohol. The cone is pumped up and down in the canal until it is entirely dissolved. The canal is filled about three-fourths full, the remainder is filled with oxychloride of zinc cement. The case is again radiographed and, if satisfactory, we can give a sigh of relief and feel that again we have done a real service for humanity. It has been hard work and in the case of the molar has consumed not a half hour, but more likely four or five hours.

In closing let me repeat one idea expressed earlier in the paper. No longer can it be said that simply because we do not have the symptoms of acute septic pericementitis or the establishment of a fistula that, that particular pulpless tooth is not giving the patient very serious trouble, or that it is not rapidly becoming the seat of very serious trouble later on. What we do not know for a fact we must not state as a fact. Having assumed the responsibility which our patients place upon us in this operation, let us do it in a manner which will not reflect upon our ability.*

Case Histories.

Where there is a history of systemic disturbance

Case I.

and dental origin is suspected, but no teeth giving trouble, it will be desirable at time to use large plates, taking a picture of each side of the jaw, as shown in Figs. 8 and 9, which are radiographs of the right and left side of the same patient.

In Fig. 8 we observe a suspicious condition of the second upper bicuspid, and in Fig. 9 there is an abscessed root on the first upper molar and imperfect root filling in the second lower bicuspid. These three teeth, therefore, should be radiographed with dental films in the mouth to obtain better records of the real condition of the periapical region.

*Dr. E. A. Woodworth, bacteriologist, has furnished valuable material for this paper.

Items of Interest



Fig. 20.

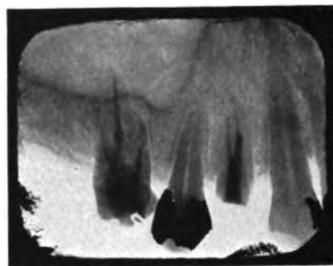


Fig. 21.

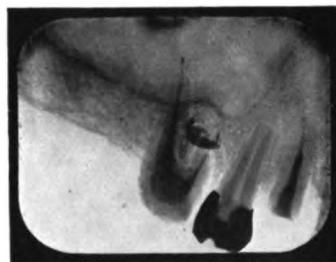


Fig. 22.
Case IV.



Fig. 23.



Fig. 24.

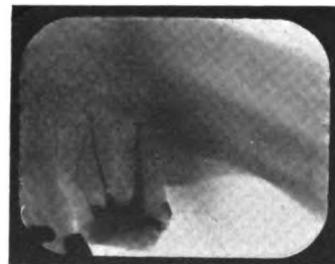


Fig. 25.
Case V.

Fig. 10. shows a fistula opening on the chin which was attributed to an abscess at the end of a lower central incisor.

Fig. 11. The lower incisor, in which, oddly enough, we find two root canals.

Fig. 12. shows the case after root amputation and root canal filling. The shadow below the root is caused by a dressing.

Fig. 13. large film showing general view of upper teeth.
Case III.

Fig. 14. same case, small dental film, showing rarefied areas above the cuspid, second bicuspid, first and second molars.

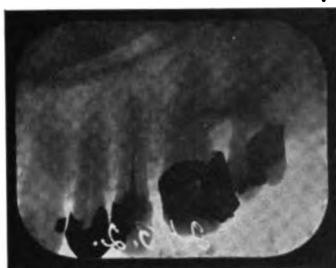


Fig. 26.



Fig. 27.



Fig. 28.
Cases VI, VII, VIII and IX.

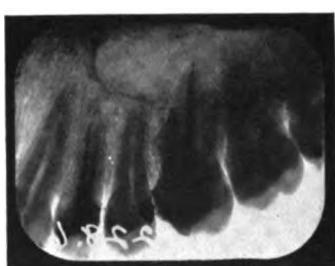


Fig. 29.

Fig. 15. same case, small dental film, showing improper root fillings and rarefied areas above first and second bicuspids.

Fig. 16. same case, dental film showing lack of root filling in second molar, right side below, causing rarefaction.

Fig. 17. same case, dental film, showing improper root filling in second lower left bicuspid.

Fig. 18. dental film showing improper root filling in first and second left lower molars with rarefaction and root absorption.

Fig. 19. dental film taken to examine conditions under left lower cuspid and bicuspids. Tissues found to be normal.

Fig. 20 shows incorrect root fillings and rarefactions about first upper bicuspid and first upper molar.

Fig. 21, same case, with roots filled. As it was impossible to reach the apex of the mesial buccal root of the molar, the end of this root was amputated, **Fig. 22**.

Fig. 23 shows incorrect root fillings in teeth used as abutments for a bridge.

Fig. 24, same, after correct root filling.

Fig. 25, same case, correct root fillings in upper molar on the opposite side.

Fig. 26, canal filled in upper right second bicuspid with measurement wire in molar.

Fig. 27, correct root filling in upper right cuspid.

Fig. 28, root filling in lower molar.

Fig. 29, root filling in upper right bicuspid and first molar.

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American Society of Orthodontists.

Discussion on the Paper of Dr. Kemple.*

**Dr. H. A. Pullen,
Buffalo.** The concluding paragraphs of Dr. Kemple's paper, in which he states that the fewer and simpler the appliances and the shorter time they are on the teeth the better, presents ideas of rational treatment

with which we can all agree, but the essayist has so modified his more radical assertion as to the age when treatment should be begun, and as to the extent of the influence of such treatment, that when I think I have found a point of disagreement in part of the paper I am confronted by a preceding or succeeding modification of the point on which we might disagree.

As to the proper age for treatment, the essayist prefers the age of nine or ten, but admits that "no fixed rule can be made which will be a safe one to follow in all, or even in the majority of cases."

If I were to take a census of the average age of the patients in the practice of orthodontists generally, I believe that the age of nine or ten would be found to be the prevailing average. I am more than willing to agree that the infant in arms of two, three or four years of age is too young to treat except in cases complicated by bad habits of thumb-sucking and mouth-breathing, etc., where perhaps some mechanical work is necessary to assist in breaking up these habits. There is a very good reason for not attempting to develop a dental arch at the age of two or

*Dr. Kemple's paper appeared in the June issue.—EDITOR.

three, and that is, that the artificial stimulus of treatment is unaided by Nature, the period of most rapid growth not supervening until within a few months preceding the eruption of the central incisors. In a two-year-old child there is nothing to develop, so to speak, but there may be malocclusion which ought to be corrected before six years of age.

For example, if a Class 1 malocclusion of the deciduous teeth presents with one upper half of the arch in lingual occlusion, the widening or expansion of the upper arch unilaterally before the eruption of the first permanent molars or the upper incisors appears to be rational and admirable treatment, more in the nature of preventive treatment, as it were. By such treatment the arrested development is corrected and normal development initiated, so that there is a better opportunity for Nature as an orthodontist to do her work. In other words, Nature as an orthodontist cannot begin until this kind of malocclusion is corrected, and if not corrected, Nature is helpless to prevent more serious malocclusion in the crowding of incisors and lack of lateral development, etc., which ensues.

Another example of wise early interference, as it has been called, would be in a Class 3 deciduous malocclusion. From my experience in these cases at five or five and one-half, I believe that the restoration of normal mesiodistal relations of occlusion also gives Nature the best chance for normal development, which opportunity, if missed by advising later treatment at ten years, allows five years of abnormal development of the dental arch and maxillary arch and of the facial muscles which are likewise affected.

Class 2 cases, I believe, will respond to such development better if begun after the eruption of the first permanent molars, and upper central and lateral incisors, but even in these cases I believe that eight years of age is not too early for treatment. Early treatment and control of the developing dental arches in these cases would seem to be our only hope of final retention.

In regard to the malocclusion of individual teeth, torso-occlusion of recently erupted permanent teeth also seems to call for immediate treatment, as their retention is more permanent in every case than if allowed to continue long in torso-occlusion.

Influence of Treatment on Associated Structures. The paper strikes a hard blow at all of the newer theories in regard to the influence of treatment of malocclusion and development of the dental arches upon the growth of the directly and indirectly associated structures of the internal face. The essayist states that these theories are "purely presumptive," that they are statements of what we would like to believe might take place.

I do not believe that the essayist would like us to believe that these theories are simply "scientific imagery," or products of the imagination alone. There is always another side to every question. In other words, every theory is debatable. The other side of this question under consideration is debatable as well, whether we arrive at any absolutely proven conclusion or not. We must have certain workable and tenable theories in orthodontia, even though some of these theories are difficult to demonstrate as facts. One of these theories which the essayist especially ridicules is the influence that treatment of malocclusion may have in stimulating development of regions closely associated with the alveolar process, or as remote as the antral sinus, the sella turcica, the seat of the pituitary body.

I do not think that this theory of development of associated structures through orthodontic treatment is so hard to believe. The essayist has not presented any arguments against the support of this theory. It seems to me that we have macroscopic if not microscopic evidence of the growth induced by orthodontic treatment. Impacted teeth erupt quickly many times when freed from pressure, and the developmental area surrounding them is stimulated by treatment. The beneficial results to the nasal regions, while not evident from the appearance of the structures, exhibits often such restoration of normal function as is clearly noted.

There is as much reason to believe in the increased development of the nasal regions as a result of orthodontic treatment as there is reason to doubt it. The only facts with which the essayist attempts to overthrow this theory are the measurements of some skulls which vary in the relative proportions of the dental arches, nasal sinuses, etc., and in view of the fact that these skulls were perhaps not typical of the general average, I do not believe the measurements warrant the deduction that the size of the dental arch has nothing to do with the size of development of the nasal spaces and antra.

In support of the theory that dental arch development is related to the development of the superimposed nasal structures, it might be suggested that the interrelationship of function is evidence of at least some interrelationship of structure. If bone grows as a result of mechanical stimuli, and the extent of that development is measured by the stress, than the development of the osseous structures in continuity of the dental arches ought to exhibit some results of the stress of occlusion. If the function of occlusion is increased by orthodontic treatment, the result of increased function ought to influence the growth in the nasal structures in some degree proportionate to the increase of function in the dental arches.

May I ask, "What is the extent of the influence of orthodontic treatment?"



The essayist answers this by saying that the benefits to hundreds of children are seen on every hand. "Behold them and judge for yourselves."

I infer from this that he feels the child is benefitted physically. Can we limit these physical benefits to areas not inclusive of the nasal regions or even the regions higher up in the internal face, which are contiguous in structure to the osseous structures of the jaws. If not, then the influence of treatment of malocclusion must extend to all contiguous tissues, to the dental arches, the nasal regions, and the internal face.

I have no doubt, however, that the caution of the essayist against too early treatment and too long treatment of young children is well advised, and as a general principle I heartily agree with him. As to the extent of the beneficial influence of dental arch development, I do not believe we have as yet overshot the mark in our theories of the extent of that influence, although they cannot be always proven.

I want to congratulate the essayist on having **Dr. Milton C. Watson**, the courage of his convictions, though his attitude **Detroit.** on this subject is somewhat more pronounced than

my own. If we would print one particular paragraph of his paper in italics, I would be quite willing to simply endorse the paper and let it pass, hoping by this means to tone down the few radical ones and trust the others to take care of themselves. The particular paragraph referred to is the one in which he says: "I do not believe that any fixed rule can be made which will be a safe guide to follow in all, or even in the majority of cases. Conservative judgment, based on careful observation and experience, must always be the safest foundation upon which to place our decision." This paragraph states an axiomatic truth, and yet gives us sufficient latitude, so that any one of experience who has studied this problem carefully may feel that he is still well within the bounds of reason and good practice, even though he may occasionally treat little four or five-year-old children, as Dr. Kemple does himself sometimes.

As Dr. Kemple has told you, orthodontia has gone through exactly the same experience that every other branch of the healing art has, namely, going from one wild extreme to another. This all leads to the conclusion that years of experience and intelligent observation is most essential, if we wish to avoid serious mistakes, and that we are all dependent, in a large measure, upon the observations and deductions of all intelligent and reliable operators who have preceded us.

I have been greatly interested in this particular subject for years, and it was not until after careful observation of a large number of cases that I came to any definite conclusion in regard to the need for ortho-



dontic interference in children as young as four or five years of age. I have histories of some of these cases running back ten years or more, and of the cases that I have been able to keep track of, every child—of otherwise average development—who showed utter lack of increasing development in the temporary arches at five years of age, either required subsequent treatment or now has malocclusion.

I am firmly of the opinion that all Class II and Class III cases should be put under treatment as early as it is possible to handle the child with a reasonable degree of comfort, which usually will not be earlier than four years of age. I do not, however, believe that this will, in the majority of cases, entirely prevent malocclusion in the permanent denture, but it still has many advantages by way of lessening the degree of the future malocclusion and in balancing the development of the external face as well as the deeper structures, to say nothing of the effect on the masticating efficiency and the respiration. I believe it to be clearly our duty to advise treatment of young children, rather than to wait until a later time in all cases where there is a *well-marked* insufficient development, and especially if the structures under consideration show a tendency to much slower growth than the other structures of the body. Every one of us has doubtless had the experience of treating simple cases belonging to Class I, where they came under observation just about the time the temporary molars were being lost, and within a comparatively few months we have been able to establish eminently satisfactory occlusal relations, which we have been able to maintain with comparative ease, but it is equally true, on the other hand, that a large percentage of the cases belonging to Class I, which are allowed to go without attention until eight or ten years of age, show such a marked elongation of the incisors, as compared with the molars, that the treatment is decidedly more complicated, and the satisfactory retention of such a case infinitely more difficult, with a much greater chance of a result only partially satisfactory; therefore, good judgment must, after all, be our guiding influence.

**Cases from
Practice.**

As a matter of curiosity, I have carefully gone over twenty-five cases, taking them just as the models appear in my cabinet, the oldest of whom is eleven and one-half, with the following result:

In seven of these cases, belonging to Class I, the lower incisors were striking the gums just back of the upper incisors, and in several of the cases to such an extent that the treatment is much more difficult. These seven cases were respectively seven and one-half, eight and one-half, seven, eight, eight and one-half, ten, and eight and one-half years of age. Another case, eleven and one-half years of age, belonging to the

Second Division of Class II, shows such a marked elongation of the anterior teeth that I have very frankly told the parents that I do not expect a result that will be entirely pleasing from an aesthetic point of view. There are among these twenty-five cases two belonging to the First Division of Class II, one four years of age and the other four and three-quarters, one of which already shows an excessive supra-occlusion of the lower incisors.

I am firmly convinced that the cases belonging to Class I, where treatment has become complicated by inharmony in the degree of eruption of the anterior and posterior teeth, and which represent nearly one-third of the cases mentioned, would have been handled much more easily if the treatment had been started at an earlier age, and that the degree of success attained would have been more satisfactory. My own experience, however, leads me to the conclusion that it is only rarely indeed that a child under four years of age can be successfully managed, and that it is not always the part of wisdom to start the treatment even then, notwithstanding the fact that the case clearly requires orthodontic interference.

I feel that the essayist is a bit pessimistic when he says: "We do not know that the bony structures which underlie the alveolar process are stimulated to any greater or better development through orthodontic measures than they would be without it." We certainly have most convincing evidence that the lack of occlusion and of the stimulating influence which it exerts does interfere to a marked degree with the development of the true bone, as shown by the experiments of Dr. Lawrence Baker, as reported to this society some years ago. If the mechanical destruction of the natural stimulating influence has such an apparent effect, what other conclusion can you possibly draw than that to supply, mechanically, a somewhat similar stimulation, where the natural forces are lacking, will have its effect on the same structures? At any rate, until positive evidence to the contrary is shown, I believe we should be guided by such apparently strong evidence.

**Relation of
Oral and
Nasal Spaces.**

That the proof of an actual enlargement of the nasal spaces through widening the upper arches is not conclusive, is, of course, the opinion of many men, though we all agree that normal respiration is improved in the majority of such cases, and this

being true, it is certainly logical to do the operation as early as possible, for no one, so far as I know, doubts that the performance of its normal function is essential to the highest development of any organ. Is it not also true that in overwhelming numbers we do find a rather definite relation between the oral capacity and the breathing capacity, though the



shape of the nasal spaces may vary greatly, being either wide and not very high or narrow and much higher?

Any child who shows a marked furrow or crease in his tongue, where it folds upon itself for lack of room, needs to have his oral space enlarged, in my judgment, regardless of age, and when it is done his breathing will usually improve, and it is not of prime importance whether this improvement is all due to providing a place for the tongue, so that it is not crowded back into the naso-pharynx, or whether a part of the improvement is due to an actual increased growth in the nasal spaces. In fact, it is quite possible that Nature will determine this point for herself as soon as she is relieved of the original handicap.

If it could be proven conclusively that just as good results can be obtained by delaying treatment until eight or ten years of age, I would be delighted, for it would certainly confine our responsibility to a much shorter time, and would relieve us of the burden of overcoming the extreme timidity which is so often present in the beginning with four or five-year-old patients. I must say, however, that it has only been on the rarest occasions and in the very simplest cases that I have been able to give a patient final dismissal in two years, which Dr. Kemple mentions as the minimum time required for some of these delayed cases.

Many conditions are self-corrective, and in such, interference should, of course, be studiously avoided. My chief criticism of this paper is that the casual reader will be led to draw a false impression in regard to the class of cases where such conditions really exist. I am, however, in perfect accord with Dr. Kemple when he warns against the "early treatment doctrine" as a positive rule for all cases.

This is an extremely valuable paper, and the conclusions drawn by the author are worthy of careful study and thought. I think the time has arrived for us to draw more carefully the lines and know more of the conditions under which we should commence early treatment and when we should not. Dr. Kemple has, I think, carefully drawn those lines. If you begin the practice of orthodontia with unbounded enthusiasm, with the idea of treating every case that shows a departure from the normal immediately, you will soon realize that this is a view from which you must recede. The cases must be very carefully considered.

I do not want to repeat the discussion that has already taken place, but to consider the matter from the viewpoint of the question as to how much treatment will interfere with the normal function of the child's teeth. If we start the case at five or six years of age, we must continue the treatment of the case in some form, with appliances or retention, and

have some appliance on the child's mouth for five or six years. This interferes with the function of mastication. Of course, it depends somewhat upon the skill of the operator. If an operator is able to so carefully fit his appliance and so carefully continue treatment that the function of mastication and normal development is not interfered with, well and good. But there are cases in which the appliances are irritating and where they continue to interfere with the function of mastication, the cleansing of the teeth, and what normal development there would be.

What is normal in a child at different ages and what is abnormal, I think has not yet been carefully determined, that is, as regards development in the width and forward movement of the arch. We know that distocclusion is not normal, nor is mesiocclusion normal, but just how we can judge the state of development at different ages has not been determined.

**Examination
of Child Skulls.**

I have been interested in the last two weeks in examining a number of skulls of Indian children, and have found some things that I did not expect.

I think you will remember I showed you several years ago at Denver some slides of cases of children who had come to my office at different ages and not received treatment. For example, one at four, some at six, some at eight, some at ten, and some at nine. These children had not received treatment. Comparison of the same arches at different ages disclosed the fact that there was no development. I examined the other day something like eighty skulls of children under the age of twelve. They were Indians, Mexicans, and some Esquimaux, all people in a primitive state. I took my charts as standard of development in the examination of the skulls. The width of the arches in children under five years of age was considerably below the normal. I took the measurement of the second deciduous molar and compared it with the second bicuspid of the permanent arch chart. I found seventeen children under five years of age, and all of them were from that standpoint underdeveloped, and not very different from the civilized children who come to us to be treated. I did not find nearly as much space between the anterior teeth as I would have expected. That is difficult to determine, because most of the incisor teeth have been lost from the skull on account of the conical shape of the roots. From the age of six to twelve I found nearly fifty, and as near as I can determine you can call practically every one of them normal across the first molar, indicating that from the age of five to ten and twelve there had been great development, far more development than in our children. I noticed also that the cusps of the temporary teeth were worn absolutely flat, and many of them half way to the gums, and we could fairly draw the conclusion that the development was due to use in mastication.



Coming back to the question of treatment, I think we ought to take into consideration in using an appliance how much we are going to interfere with the function of mastication. I agree largely with Dr. Kemple that many of these cases by poor judgment can be overtreated. We may leave an appliance on for too long a time. We may interfere too much with mastication, the very function we should try to stimulate and the function which seems to be the cause of development in the arches of primitive races. In the matter of simple underdevelopment it is a question whether some of these cases would not do just as well if we let the children go until they were ten years of age, provided the function of mastication were properly exercised.

Dr. R. Ottolengui. I would like to ask Dr. Hawley how he determined the age of these skulls?

Dr. Hawley. I judged those under six by the fact that the first molars were not erupted. We have to keep in mind all the time that the Indian child erupts its teeth earlier than the white child. I could see permanent molars in the crypts, but unerupted. In the same way I judged the age from the loss of the other teeth and position of the second molars, the second molars erupting near eleven and twelve. You can make a fair guess in that way.

I want to emphasize one point Dr. Hawley has brought out, because it is the most important thing that has been said in connection with the discussion of this subject, and that is in regard to the stimulating influences of the natural use of the teeth. I think the slides of many of the children who apparently require treatment show that they would get along nicely without treatment if there were a possible way to induce vigorous exercise of the jaws. I believe lack of jaw exercise to be one of the predominating evil influences in the production of malocclusion.

Dr. J. Lowe Young, New York City. I would like to compliment the essayist on his paper, and particularly on his courage to come out as he has in the open. Let me call your attention to one point that has not been touched on; if it was, I did not catch it, and that is what takes place when we move a tooth. To move a fully erupted tooth we cause resorption of bone on one side, and this bone must be re-formed or built up in order to have the tooth remain in its new position.

Nature's way of building bone is so difficult to understand that it is very, very doubtful if we ever move teeth slowly enough to harmonize with Nature's laws.

As the roots of the deciduous teeth are resorbed, the bone surrounding them is also resorbed, and as the permanent tooth erupts, new bone is



also built up to support it. Is it not logical that a tooth guided to its proper position during the period of eruption is far more liable to remain in this position and have bone developed in a more physiological manner than if allowed to erupt into a malposition and then be moved? This is the reason why I am very much in favor of early interference in these cases.

Since I have been using the new Angle appliance I have studiously avoided attaching the arch wire to an erupting tooth with a pin. In many cases I have been able by means of delicate springs attached to the arch wire and extending lingually to the erupting tooth to guide it into its proper position and not interfere with the natural process of eruption, or at least to a very slight degree.

What I said last year was that I did not think there was any mechanical appliance ever devised which would move a tooth exactly as Nature does it during the process of eruption, but the nearer we come to Nature's way of moving a tooth, I believe, the better.

Dr. Federspiel. Why not let Nature do it?

Dr. Young. If she will do it, let her, by all means.

Another point I wish to speak about is the wearing of appliances during the entire period of eruption of the teeth when treating young patients. In my judgment, it would be folly to have a child wear appliances during all this period. I would advise expanding of the deciduous dental arches sufficient to accommodate the four incisors, and after their eruption all appliances may be removed from the mouth until the teeth that replace the remaining deciduous teeth begin to erupt. If these start in malposition, I would then use some simple appliance so as to guide these teeth into their proper positions during the period of eruption. This particularly applies to teeth requiring rotation.

Bicuspid teeth can be banded without any annoyance to the patient, just as they peek through the gum, and at this stage of eruption can be rotated in a few weeks, and after three months retention may be liberated.

This method of treatment necessitates more appliances than if the child were allowed to wait until he was ten years of age, but the satisfaction of knowing that the teeth will remain in their proper position after the full compliment of permanent teeth have erupted, except the third molars, more than compensates for the extra time spent in making appliances.

My best results have all been in cases I have treated early in life.

I would like to say a few words on this subject.

Dr. U. B. Jackson, I recommend placing all teeth in proper position
New York City. while erupting or as soon thereafter as practicable.



That statement I made several years ago. Dr. Guilford included it in his text-book. I have been an earnest advocate of the early regulation of the teeth for many years. An apparatus can be constructed so that no especial discomfort or pain should be caused the patient from its use.

Finally I planned and have employed a permanent record system and an apparatus governing the exact amount of force applied at each visit, usually at intervals of once a week. I have a young patient in whose case there is a considerable amount of space between the upper deciduous incisors and the lower ones, the upper arch protruding very much. Shall we not begin to treat these cases as early as possible with a suitable appliance, getting the tissues equalized and functioning so that Nature will build the necessary tissue into a normal form while the arches are in their most active developmental stage? If so, how long should the appliance be kept in place? I would reply, continue the treatment just as long as is necessary to permanently correct the condition. Continue the treatment with the child just as one would in treating an adult, even though it is sometimes necessary to continue the treatment a considerable length of time. We generally get better results from early treatment, and it is necessary that we do the best for our patient, regardless of the length of time consumed.

I am presenting models here of a case of a child four years old, with narrow arches and distal occlusion, which illustrates some of the conditions we have mentioned.

No organ of the body will properly develop unless it is functioning. A delay in regulating often encourages nasal obstruction.

If a child's lips do not close properly, and there is protrusion of the upper incisors, a serious condition of the occlusion will usually be brought about if neglected for two or three years.

We should correct these conditions early, causing the lips to close normally and know that the nose is functioning properly, that is, being employed rather than the mouth for breathing.

At the clinic here I showed the models of a case of a child four years old, having lack of lateral harmony of the arches, where, I am sure, if it were our child we would not be willing to delay its correction.

We had a beautiful illustration of an impacted **Impacted Molars** third molar, shown and described by Dr. Ottolengui.

Although the subject is not now before us as to how we should treat impacted molars, I will make a few remarks regarding it. We need not follow the old practice of the general practitioner of dentistry in extracting all impacted third molars; it is our work as orthodontists to save these teeth. We go to college to learn how to save teeth. Of course, if the position of the third molar



cannot be corrected, it should be extracted, but we should relieve the impacted molar by orthodontic methods, tipping the molar to an upright position. I shall be glad at some time to go over that matter and tell you what I am doing. I am saving these third molars in almost every case. Where one is so deeply imbedded in the bone back of the second molar that Nature cannot force it to proper position, we need not always necessarily resort to general surgery for its removal, but it is our duty to save the molar by forcing distally on the crown to dislodge it, and at the same time control congestion by proper medication. It is unreasonable to say that an impacted molar of a patient, eighteen years of age, should so generally be extracted. The third molar does not normally erupt until the age of eighteen to twenty-one. Why should the profession be so active in removing these teeth, especially before the jaw has reached its maximum adult dimensions? The treatment amounts to the controlling of the swelling with antiseptic applications, and tipping the molar backward.

When there is swelling, one can readily get rid of the swelling and infection by forcing iodine with iodoform crystals freely under the gum into all pockets. This is usually accomplished in the ordinary case by the use of a small curved probe with cotton wound about it, and moistened, picking up a quantity of iodoform crystals, dropping iodine on the dressing by a drop bottle, and forcing the probe under the gum around the tooth, reaching into every pocket as far as may be. This lessens the swelling and permits the ordinary absorption of the tissues to go on without the danger of infection. If the third molar through its abnormal position has become firmly locked with the adjoining molar, the bony and soft tissues can be dressed away from over the enamel portions and at the same time force be applied for its correction. The molar can be first wedged from the adjoining one and when necessary an apparatus with a metal finger be applied for forcing the molar backward sufficiently to dislodge it. I have accomplished this with springs of different forms. A simple method is illustrated in my "*Orthodontia and Orthopedia of the Face*," page 413, Fig. 484.

Other methods I have employed I shall soon describe.

I just want to say a word in connection with **Dr. George B. Palmer**, Dr. Kemple's paper which came forcibly to me while **New York City**. he was reading it. When I started in orthodontia

I began with great enthusiasm to treat everything in sight. I would treat cases four or five years of age when I could get them. I soon concluded to treat nothing until the first permanent molar had erupted, and about four years ago in speaking with Dr. Kemple about one case he said he would not think of treating it if it occurred in



his practice. However, I treated the case, which was one Dr. Kemple showed this afternoon. The patient was five or six years of age, and would have been better off if I had left the case alone. So I honestly believe that in the great majority of cases these patients are much better off at eight or nine years of age than where we treat the deciduous teeth.

There is little that I can add in closing this discussion.

Dr. Kemple. I fully recognize the fact that it is more important to guide an erupting tooth into its proper position than to allow it to erupt into a serious malposition; but the point that I wish to make is simply this: Are you *sure* that the tooth will be in serious malposition when it is fully erupted?

Probably any orthodontist would have treated the first case shown on the screen at seven and a half years of age—I am frank to say that I would have treated it myself—and yet in a little over two years, without any treatment whatever, the teeth are in splendid position, this result being better than could possibly have been obtained by any kind of orthodontic interference. It is better because it came about through a perfectly natural development, and there is no probability of the teeth “going back.”

If a child is suffering from nervous strain because of impaction and crowding of the teeth, it should be relieved. But not all cases of apparent malocclusion at six or seven years of age are suffering nervous strain, or any other kind of strain, from impaction. A very small per cent. of the cases that are treated at this early age are treated because of nerve strain; they are treated early because the idea has gone abroad that every case must be treated early, at the first symptom of malocclusion. In one case shown, treatment was advised at three, at six and at seven years of age, by three different orthodontists. The parents neglected to have the work done, and now at ten years of age, without having had any orthodontic treatment whatever, these teeth are in almost perfect normal position. I do not believe any of us could have obtained better result than Nature has accomplished in this instance. I am heartily in favor of treating every case that really needs treatment, but I am strongly opposed to treating any case that does not need it. I have no definite rule for these young cases, but I am learning every day to have a greater respect for Nature's method if she is given half a chance to do her work.



Central Dental Association of Northern New Jersey.

A regular monthly meeting of the Central Dental Association of Northern New Jersey was held at Achtel-Stetter's, Newark, N. J., on Monday, April 20, 1914, at eight o'clock P. M. President Fowler called the meeting to order.

A quorum being present, the roll call was, on motion, dispensed with.

The Secretary read the minutes of the last meeting which were approved as read.

President Fowler introduced Byron C. Darling, M.D., of New York City, who read a paper published in this issue.

You have heard this very entertaining and instructive talk by Dr. Darling. It goes to prove that the dental profession is very closely allied to the medical, and it behooves the members of our society to look further into the causes of the diseases of our patients than is ordinarily done.

I wish to speak of another matter for a moment before taking up the discussion. At a recent meeting of our Executive Committee it was decided that we hold a joint meeting with the Tri-County Society, June 17th, I think it is. There has been a committee from among our members appointed and Dr. Nuffort, the Chairman, will look into the details of the athletic features and so on, and the Secretary will also be connected with the committee.

At a recent meeting of the Academy of Medicine the dentists of this section were granted the privilege of becoming members. I understand this opportunity has not been improved by many as yet, which probably has been due to oversight. Dr. Hané has with him to-night a number of applications, and those of you who would be interested along that line would probably do well to consult him. We will now proceed with the discussion.

Discussion of Dr. Darling's Paper.

R. D. Baker, M.D. I would like to divide this subject into two classes; that is, infection by direct absorption from the mouth and infection by the indirect method, by way of the intestinal tract.

The infections by direct absorption are evidenced most frequently by chronic joint conditions and mild septic states. These conditions have been very much improved or cured by the removal of the acute infective process. They have also been improved by the use of vaccines. In speaking of indirect infection by way of the intestinal tract we might say, in the first place, that the mouth is a good incubator. Anærobic conditions are furnished by the inside of food particles and by decaying teeth. The ordinary mouth flora are not pathogenic, but many pathogenic organisms do enter the mouth with food and other objects, and they are mostly of the pathogenic streptococcic or staphylococcic families. If the mouth is dirty, if it is allowed to retain food particles, or if some special focus of infection be present, as you have seen in the pictures to-night, many organisms are fed into the stomach. The stomach of normal activity and normal secretions will kill a very large number of organisms. Spores are not so readily cared for, and as time goes on spores and some organisms make entry into the intestinal tract. In the lower ilium those able to grow in a slightly acid medium begin to develop. In the cæcum conditions are more favorable to their growth. Movement of the fecal mass is slow, moisture is sufficient and the reaction is alkaline. Here is the beginning of the putrefactive state. It is a long continuance of this excessive putrefactive state which changes the condition of the mucous membrane and makes it possible for organisms to pass through and be carried into the general circulation, where if they are virulent enough they may set up any kind of septic process. The normal bowel wall probably does not allow of the passage of organisms, but there are very few of us who possess, after a few years of life, an absolutely normal bowel wall.

Conditions of ulceration along the intestinal tract may be direct; that is, they may be caused by direct infection of the mucous membrane, or they may be caused indirectly by absorption from the bowel and passage through the blood stream.

Infection by this method may give the same expressions that the more direct method does and would also be responsible for the excessive putrefactive state of the bowel and its manifold expressions.

Dr. Rosenow has connected definite organisms with definite pathologic states—joint infections, heart infections, ulcer of the stomach, nervous lesions. These organisms are found in diseased tonsils, diseased

teeth and in the bowel contents. Surely it is reasonable to connect them in the way that we have.

It is indeed gratifying to have medical men come **Joseph Nussey, D.D.S.,** here from time to time as they have recently done **Newark, N. J.** and present such papers as Dr. Darling has offered here to-night, which are of mutual interest to the two professions.

The time is fast approaching when the relationship which exists and should exist between the two professions in the study of pathology and therapeutics of the mouth will be universally established, and the official recognition of this relationship by the Academy of Medicine here admitting us to full fellowship should serve as an inspiration to all of us. The work of Rosenow and others has shown that we are possibly, at least, to blame in our prosthetic work for some of these pathological conditions of the gastro-intestinal tract, which manifest themselves from time to time, and for such local manifestation as arthritis, endocarditis, etc., and I maintain it makes for higher dentistry and for better and more efficient dentistry for us to be thus accused and given a chance to reform.

C. G. Bellig, M.D. I certainly did not come here to-night with the idea of being called upon, but I am sure that I have **Newark, N. J.** to respond. I am not prepared at all to speak upon this subject, but I will do the best I can.

In my work as a neurologist I have noted frequently enough that there may exist an association between disorders of dental origin and certain diseases of the nervous system. Of these dental conditions, carious teeth and pyorrhea alveolaris, or Riggs' disease, were those commonly observed. It has often occurred to me that this relationship was probably more intimate than we physicians suspected.

For some time past I have been particularly interested in certain types of cases of peripheral origin, in which there was chiefly an affection of the sensory mechanisms of the muscular apparatus and the fibrous tissues in intimate relation with nerves and muscles. They may be largely grouped under the term fibrositis or fibromyositis. They give rise to various neuralgic or neuritic pains and cause more or less intense annoyance and suffering. While we are able to clear them up by local treatment, yet they seem to recur from time to time.

I have been of the opinion that a certain number of these cases at least were due primarily to intestinal conditions, such as Dr. Baker has spoken about. To-night, however, it seems to me that we may have somewhat of a new light thrown upon the subject. It is probable that carious and putrefactive conditions about the teeth, and particularly

disease around the roots of the teeth, may have something to do with their production, either directly or indirectly, through the intestinal disorders initiated by them.

Thus you see that we medical men may learn something from your work. I am sure that I have profited much by being here to-night and hearing Dr. Darling's paper. I am very glad indeed that the Academy of Medicine of Northern New Jersey has recently recognized the dental profession by inviting its members in New Jersey to full fellowship with us, and that we meet you here on an equal plane to-night.

I do not know that I am qualified to discuss the **G. F. H. Kane, D.D.S.,** paper that we have heard to-night.

Jersey City, N. J. As to infections of the system, wherever they come from, it is gratifying to find ourselves on the road to the final discovery of where these poisonous substances originate.

Our patients have been suffering from all kinds of infections. We have called it poisoning, but we did not know whether it came from fermentation or so-called auto-intoxication. To my mind there is no such thing as auto-intoxication, because that means a poison made by the body itself, but most of these poisons spoken of in the paper are introduced into the system generally through the alimentary canal, or the circulation, from special seats of infection.

Talking about the treatment of these cases by anti-toxins, I had a very unfortunate case recently which may perhaps be interesting, and I would like to get some information myself as to just what the cause was. I have a patient who is a physician and a year ago I treated an upper left lateral for him which was badly abscessed. After two or three months' treatment I finally cleared up the condition and filled the root canal to my satisfaction. Some four or five weeks ago he turned up again with the trouble broken out anew—no opening or discharge, but just soreness and tenderness. I was so sure that my root canal filling had been perfect that I concluded not to remove it but to go at the trouble through the alveolar process. I found pus, a general condition of inflammation, and my gutta percha point penetrating slightly through the foramen. In getting at the history of the case my patient told me that about a week before he had inoculated himself with anti-toxin for typhoid and it was his opinion and mine that the introduction of the anti-toxin had perhaps stirred up latent trouble that had been there, and that originally I had not treated the tooth long enough to get it quite over the original infection. After he had taken this anti-toxin treatment he went to bed with a general fever, his pulse went up to 138 and he was quite a sick man. If Dr. Darling could tell me something about such conditions I would be very grateful to him. (Applause.)

Dr. Darling thanked the gentlemen for their discussion, but had nothing to add.



Dental Hygiene Week and Tooth Brush Day in the Public Schools of New York City.

A movement has been inaugurated in the public schools of New York City which will probably have an incalculable influence upon Boards of Education throughout the country. It is a common experience when a dentist tells a child to clean her teeth three times a day to have the youngster remark, "Can't do it in the middle of the day because I am in school." The writer has frequently argued, therefore, in public society meetings and with members of Boards of Education in this and neighboring States, that the schools might render a valuable service by making the cleaning of the teeth once a day compulsory; but it remained for Dr. C. Ward Crampton, Director of Child Hygiene in the Public Schools of New York City, first to incorporate methods of teaching dental hygiene into the syllabus of the New York Public Schools, and finally to organize a regular cleansing of the teeth by all of the 800,000 school children in New York City. As an initiation of this great movement, one entire week was devoted to giving an impetus to the movement, as will be seen by the report published below and kindly furnished by Dr. Crampton.

The Second District Dental Society deserves particular credit at this time. Through the long and arduous work of Drs. Thaddeus P. Hyatt, A. H. Stevenson and W. H. Rogers, a competent corps of fifty trained lecturers have been giving their services for the last five years, something

like 200 lectures being delivered annually. It happened also quite fortunately that two special classes, one of boys and one of girls, had been regularly taught the tooth brush drills. Thus when Dr. Crampton appealed for assistance, these two expert classes were all ready to pose before the cameras of the Pathé and Universal Film News Bureaus, with the result that motion pictures have been shown all over the United States, exhibiting these children in their drill. These drills had also been taught to teachers and by them to classes in other schools, so that it is not strange that the announcement of "dental hygiene field day" attracted a quicker response in Brooklyn than elsewhere. In Prospect Park, Brooklyn, about 350 children from nine different schools competed for the banner presented by the Second District Dental Society. These park drills were also photographed by the film people and will do much to popularize the idea of clean teeth throughout the United States. The amount of space given up by the daily press of the metropolis to favorable comments on this week's campaign proves that mouth hygiene has at last come to be appreciated as a most important part of general prophylaxis.

The following report of the week, furnished by Dr. C. Ward Crampton, contains many facts which will be of interest to mouth hygiene workers throughout the country:

Dr. Crampton's Report. A definite campaign, in the nature of a dental hygiene week, was launched to improve the health of public school children, May 24, 1915, and continue for one entire week, ending May 29th. The week was officially designated as "Dental Hygiene Week," and Friday, May 28th, as "Tooth Brush Day." A definite program (attached) was outlined for the week, and included the following:

Talks by Principals in practically every school in the five boroughs. Lectures by specially trained dental lecturers, members of the First District Dental Society, Second District Dental Society, and the Bronx County Dental Society; 130 lectures were given to thousands of children in all grades, from 1A to 8B, on Tuesday, May 25th, at 9 A. M.

Special meetings for the benefit of teachers, principals and adult high school pupils and others, were held in several of the high schools, namely, the DeWitt Clinton, Morris, Bryant, and the Brooklyn Training School for Teachers. These lectures were accompanied by lantern slides and moving pictures.

Special talks by the class teacher on the care of the teeth, emphasize-

ing the necessity of periodical visits to the dentist, the necessity of possessing individual tooth brushes, of preserving the first teeth as well as the second set, etc.

Parents' Association and Mothers' Meetings were held in many of the schools. Lecturers were supplied when applications were made for their services. Many of these Parents' and Mothers' Associations held meetings and discussed the subject of oral hygiene among their own members.

Friday, May 28th, was set aside for the inspection

Tooth Brush Day. of tooth brushes and the actual demonstration of the tooth brush drill taught earlier in the week. It is estimated that at least 400,000 children brought tooth brushes to school on this day.

This idea is new in Dental Hygiene Campaigns.

Dental Hygiene Field Day. The schools were divided in three boroughs, Manhattan, Bronx, Brooklyn, and the Tooth Brush Drill Contests were held on the Sheep Meadow in Central Park, the Parade Grounds in Van Courtland Park, and on Nethermead in Prospect Park.

Because of the strangeness of such an advent, the representation of classes in the parks was only fair. However, more than 550 children took part in the drill. Many of the children were dressed in fancy costumes. The winners in the respective boroughs were P. S. 139, Brooklyn; P. S. 33, the Bronx; P. S. 77, Manhattan.

Moving Pictures. These were taken by many of the motion picture concerns, who are now displaying pictures of the tooth brush drill in the moving picture houses in New York. Later these pictures will be sent all over the country, and it is expected that the idea of a dental hygiene campaign as conducted by our Bureau will be accepted by many other communities.

Co-operation with the Dental Societies. Our Bureau was very ably assisted by the Second District Dental Society, through its President, Dr. William M. Frazer, and its members, most notably, Drs. A. H. Stevenson, Thaddeus P. Hyatt, W. H. Rogers, and R. Ottolengui; by the First District Dental Society, through its President, Dr. Wm. D. Tracy; and by the Bronx County Dental Society, through its President, Dr. Waldo H. Mork. They aided much with advice and information, and it was through its financial support that moving pictures and operators were obtained. "Clean Teeth—Clean Mouths" banners, awarded to the winners of the Tooth Brush Drill, were donated by these societies.

Never before has the daily press been more enthusiastic in commenting so favorably upon a campaign as this one. We were favored by daily press notices numbering in the hundred. Pictures in the dailies of children demonstrating the Tooth Brush Drill, cartoons, editorials, and special interviews, helped popularize the movement among the parents.

Many of the dental companies supplied the **Commercial Houses**. children with samples of tooth paste and tooth powder. Others contributed literature on oral hygiene. One company has donated a large solid silver loving cup to be awarded through our Bureau to the "public school whose graduating class has made the best showing in oral hygiene for the year." In addition, this company has supplied us with splendid oral hygiene charts, educational have spent large sums of money educating the people through a most in character and free from all advertising material. These companies wonderful system of advertising in the newspapers. Hundreds of the largest drug stores in the city featured Dental Hygiene Week by having large window displays of tooth brushes, tooth paste, mouth washes, etc. With the purchase of a tooth brush, many stores gave away a large tube of tooth paste free of cost. Where the moving pictures of the Tooth Brush Drill were being shown, one dental cream company had men distribute samples of tooth paste and oral hygiene literature to the people as they left the theatre.

Correction.

Through an error on the part of engraver, in placing the letters on the illustrations used as a frontispiece last month, our entire object in publishing these pictures was destroyed. The descriptions under the illustrations should have read as follows:

Figure A.

- (a) Inclusion, bright red.
- (b) Rim of amoeba, dark blue.
- (c) Interior, pale blue.

Figure B.

- (a) Protoplasm or body, pink.
- (b) Nucleus of epithelium, blue.
- (c) Nucleus of pus cell, dark blue.
- (d) Protoplasm, pale pink.



A STORY IS TOLD of a Young Farmer whose uncle, on his mother's side,
◆ died and bequeathed him a hundred thousand dollars. On receipt of his
◆ fortune he hied him unto the Great City, and soon became Well-known
◆ and Popular in the White Light District. He seemed willing to spend
◆ money like water, and all the Water-wagon Riders helped to show him
◆ how to Let-her-flow. As soon as it had all flowed away, he fled back to
◆ the Farm, donned his over-all's and was happy and contented once more.



THEN HIS UNCLE, on his father's side, died, and likewise bequeathed him
◆ a hundred thousand dollars. On receipt of the letter with the Glad Tid-
◆ ings, the Young Farmer, leaned on his hoe and exclaimed: "O, Lord!
◆ Have I got to go through that all over again!"



THAT WAS ABOUT how I felt when I received the little paper from Dr.
◆ W. I. Prime, in which in a few lines he solves the whole problem of root
◆ canal filling for us. Just think of it! No rubber dam! No special treat-
◆ ment, nor special filling for special cases. No trouble at all apparently
◆ to reach the apical foramen, or foramina as the case might be. Just
◆ cleanse with broaches and warm water, squirt some paste into the canals
◆ with a jiffy tube, and push it home with a peldorf of cotton till the pa-
◆ tient cries "Ouch!" Simple, isn't it? Oh! Would that it were true! But
◆ Dr. Prime says he has been using this method for over two years, with-
◆ out any failures, to his knowledge.



DID YOU EVER NOTICE how many love stories end with, "And they lived
◆ happily ever after!" whereas if a second volume were written it would
◆ be filled with the nauseating details of the nasty divorce case? Well it
◆ is just the same with root canal treatment. In all these cases of easily
◆ filled and easily cured tooth roots, that "never gave trouble afterwards,"
◆ the second chapters contain stories reeking with pus and putrescence;

- ◆ with stomach ulcers, arthritis, and death. Yet the dentist rests happy
- ◆ in the belief that "they never gave trouble afterwards!" Uugh!



IT MAY BE TRUE, of course, that these teeth do not trouble the dentist

- ◆ again, but what about the patient?



I WROTE SOMETHING LIKE THIS to Dr. Prime: I told him I thought

- ◆ this paste method of filling teeth all wrong, and that the publication of
- ◆ such articles do more harm than good; but in reply he wrote that he
- ◆ would like to have the paper published over his signature; that his ex-
- ◆ perience proved to him that it is a good method, and that he would like
- ◆ to hear from others on the subject.



AS A METHOD of this character would be highly desirable if efficacious, and

- ◆ highly undesirable if erroneous, the best course seemed to be to publish
- ◆ the paper as requested, and along with it the opinions of men whose
- ◆ opinions will be respected. Consequently Dr. Prime's paper appears in
- ◆ this issue, which is especially devoted to the subject of root canal treat-
- ◆ ment and filling, and now let us hear the views of a few experts to
- ◆ whom Dr. Prime's formula was submitted. And be it remembered that
- ◆ what they say of one paste filling is equally applicable to all so-called
- ◆ antiseptic root canal pastes. Before passing this let me call attention
- ◆ to what Dr. Best says of pastes. He declares that he has obtained bac-
- ◆ terial cultures from all root filling pastes tested, and in this my own ex-
- ◆ periments bear him out.



DR. J. P. BUCKLEY writes as follows: "In my opinion infections can occur

- ◆ about the root of an imperfectly filled canal, but such infection does not
- ◆ always occur. This is no excuse for being careless, neither is it an ex-
- ◆ cuse for using medicated pastes, with the end in view of having the
- ◆ medicine keep the canals sterile indefinitely. I believe it is well to have
- ◆ certain drugs, like thymol for instance, in our root canal filling material,
- ◆ but I do not believe there is any such thing as a 'permanently antiseptic
- ◆ root canal filling.' In regard to the paste from the New Hampshire den-
- ◆ tist, will say that anyone who would depend solely on phenol for ster-
- ◆ ilizing a putrescent canal cannot expect us to have much confidence in
- ◆ other remedies which he might suggest; and surely I would not think
- ◆ much of a paste for filling roots, with or without gutta percha, made of
- ◆ alum, thymol and glycerine. Both alum and glycerine are soluble in
- ◆ water."



THE FOLLOWING IS FROM Dr. Elmer S. Best: "Possibly root canal

- ◆ pastes have some merit. They may ease the mind of the operator, but
- ◆ here their service ends. To my mind, there is as much sense in using
- ◆ such a preparation in a pulp canal which contains non-vital pulp tissue,
- ◆ with the idea of bringing about and maintaining asepsis, as there is in
- ◆ the case of the small boy, who persists in eating green apples because
- ◆ he believes in the advertised merits of 'Pain Killer.' Our experience has
- ◆ taught us that they are practically valueless; in fact some of them, in
- ◆ time, make excellent culture media for bacteria."



Items of Interest

DR. J. R. CALLAHAN speaks with the emphasis born of experience: "The

- ❖ mummification of pulp tissue I have not seen, although I have been trying for a long time in my laboratory to mummify connective tissue. The
- ❖ nearest I have come to it is when fragments of pulp tissue are saturated
- ❖ with rosin and dried. To me true mummification that will stay mummified when sealed within the living body is a myth, born of a desire to
- ❖ shirk the responsibilities we assumed when entering the practice of our
- ❖ profession.



"THE VARIOUS NONSENSICAL combinations of loose and mostly insol-

- ❖ uble, therefore irritating crystalline substances, are mixed to a thin pasty
- ❖ consistency by the addition of strongly antiseptic liquids, that are always
- ❖ irritants, if *true* antiseptic agents. This when pumped into partially prepared canals, where soon the antiseptic liquids disappear, leave the dry,
- ❖ porous, powdery mass within the canal, to become saturated with serum,
- ❖ etc.; which in a short time becomes pabulum for myriads of pathogenic
- ❖ micro-organisms, and makes a picture worthy of Puck.



"IT IS IMPOSSIBLE to fill a root canal with a plastic substance without

- ❖ forcing more or less of that substance through the larger foramina; at
- ❖ least, this fact calls for a neutral, stable and compatible substance."



DR. M. L. RHEIN says: "In every form of dental therapy outside of root

- ❖ canal therapy, it is possible to speak of results in a comparative way, so
- ❖ that even a fourth rate inlay may be of some benefit. In foot canal
- ❖ therapy there can be no such comparatively good operation. The result
- ❖ of the treatment must leave the pulpless root in such condition that not
- ❖ only infective foci have been obliterated, but reinfection around that
- ❖ particular root made impossible. There can be no compromise with this
- ❖ principle. If this is not accomplished the patient has been seriously injured instead of benefited. So that, if such a result cannot be obtained,
- ❖ the tooth must be extracted as the lesser evil; sacrificing the tooth in
- ❖ order to avoid a possible toxemia.



"THERE IS NOTHING NEW in mummifying pastes. Many years ago the

- ❖ late Prof. Miller published a similar formula. Every one knows that
- ❖ portions of living pulp may be removed and the remainder remain alive
- ❖ for years. In such cases no blind abscess will result as long as any living
- ❖ pulp tissue remains in the canals. When this ceases to be the case, infection at the peri-apical end will take place whether such a paste is used
- ❖ or not. This is said with much positiveness, because so many radiographs of blind abscesses exist in teeth which have had their canals
- ❖ packed with similar mummifying paste.



"WHAT BENEFIT does the preservative action of these medicinal agents in

- ❖ the root canals have on the peri-apical entrance to the foramina where
- ❖ there is no paste? It is important in considering this question to know
- ❖ that infective matter in the root canal proper is doing no harm until it is
- ❖ forced through a foramen. The canals are cleansed, etc., in order that
- ❖ no infectious material should reach the peri-apical region from this
- ❖ location.

"AS FAR AS GENERAL INFECTION is concerned, our interest must always center in the peri-apical region. It is here that the nonhemolytic streptococcus comes floating along, and if any suitable nutrient exists around a foramen, the streptococci commence to nest there. It is on this account we have learned that even after all pathogenic tissue has been removed, secondary infections may take place in the peri-apical region, unless the root filling seals the peri-apical entrances to the foramina, as well as the canals themselves. Consequently, the honest practitioner must decide (if the patient is unable to have proper pulp treatment) whether the retention of a front tooth even is worth jeopardizing the life of the individual."



DR. RUSSELL W. BUNTING: "The filling of root canals is the most exact surgery which the general practitioner of dentistry is called upon to perform, and is perhaps the most important operation of his daily routine. The successful performance of root canal work demands an intimate knowledge of the anatomy of the teeth, and careful and painstaking labor in the extirpation of all pulp tissue. When the canals have been cleansed they should be filled with a substance which is insoluble in the body fluids and which is impervious to moisture."



"IT IS THEN LARGELY a question of the ability of the individual operator to find canals and to successfully operate upon them. It has been my experience that the careful operator will thoroughly extirpate and fill all root canals that are of considerable size, and will only fail in the extremely small and tortuous canals, and few of these. In such most difficult cases the use of the radiograph is of great assistance. But in case no means are at hand whereby further progress may be made, and such canals are rendered aseptic and filled as far as possible with a permanent root canal filling, the possibility of such canals giving future trouble has always been somewhat a doubt in my mind. When we examine radiographs of a large number of teeth and see how many root canals have been but partially filled by even the most careful operators; and when we note how few of these have undergone a subsequent infection, we cannot but feel that nature has means of protection, and that she may be successful in maintaining health when the odds are not too great against her."



"IN ALL SUCH CASES the use of germicides and dessicating agents should make the canal contents less favorable for bacterial growth and raise the factor of safety. I believe, however, that the final filling of all canals should be made with a material which is insoluble and impervious to moisture."



"HAD THE EGYPTIANS buried the mummified bodies of their ancestors in the banks of the Nile, they would have been no more foolish than the operator who depends upon mummifying agents to take care of considerable amounts of pulp tissue. Such agents should only be used when all surgical measures have failed and the operator is reasonably certain that the remains of pulp tissue are exceedingly small; and even then they are not safe."

JUST TO BE FAIR, and not have this entire talk on one side of the question,

- ❖ I will here introduce a communication from Dr. L. C. Burgard of Louisville, Ky. He says: "You will pardon me for calling your attention to certain conclusions that are apparently in antagonism to others. Take the question of root canal work. The methods of accurately working out the finer canals as popularized by Dr. Rhein and yourself are good, but is it a technique that is practical in the hands of ninety-five per cent. of the dentists?



"HOWEVER, HERE COMES DR. GRIEVES in a recent article and states

- ❖ that he finds as many blind abscesses on well-filled root canals as partially filled ones, and he further states that from twenty per cent. of the root canals it is physically impossible to remove the pulp completely.
- ❖ Also, Dr. Buckley teaches, if a canal is so small that a small broach will not enter, it is good practice to make a paste of formocresol and calcium phosphate, placing same over mouth of canals and covering with cement.



"AGAIN COMES DR. BLAIR, of this city, the 'Pus Cure' man, with sixteen

- ❖ radiographs so far made from patients, where after the tooth was de-vitalized only the main pulp portion was removed, and his paste sealed in, some of eight years' standing. The radiologist informs me that no pathological symptoms have developed. I admit this is contrary to surgical pathology.



"IN TEETH I HAVE WORKED on outside of the mouth, I find to open and

- ❖ enlarge these fine canals is a task, and sometimes I never succeed to my satisfaction, although when it comes to complete access, all is in my favor. Now to dry them and fill to end is another question. Therefore my aim being to adopt such routine or technique as is practical, I have come to this conclusion: First—That blind abscesses, etc., are caused by the carrying of septic material into the canals and not so much from faulty removal of pulp or imperfect filling. Second—I believe in arsenical devitalization, because in so many instances it is not possible to sterilize the cavity so that septic material might not be carried in by using pressure anaesthesia. Third—On opening my pulp chamber, I endeavor to be as careful with my technique in reference to sepsis as a surgeon. I remove the larger pulps with broaches, and the smaller, open to the best of my ability with Schreir's paste. But I will not consume any useless time on these hair-width canals. Then I seal in formocresol. This is recommended by Dr. Buckley, and I feel very grateful for the suggestion. What remnants I may not remove are then saturated with the cresol and asepticized with formalin. Fourth—Use euca-percha; find it so much easier to introduce than the rosin solution or chloro-percha. Use E. P. when it is so dry as to be 'mealy,' but by placing bottle in hot water it soon becomes a thick, smooth, oily consistency; to the E. P. I add two drams of iodoform to the ounce. This is pumped in and pulp chamber partially filled. Now, with a ball of cotton I crowd down on this and force to the very apex this E. P. Now crowd my points and pack it. Fifth—The small impossible canals. Partially open canals and chamber, dry out and fill with Oxychloride of Zinc (Ames). In practice this has

◆ given uniform, absolute results. Teeth which I so devitalize, I never
◆ have any soreness in, and some of these chronic, sore teeth, where others
◆ have failed, are made absolutely comfortable."



DR. BURGARD IS KNOWN to me as a thoroughly conscientious practitioner, and his communication is published with pleasure, especially as it may lead to further discussion, and this subject must be continuously discussed until a safe and sane method of treatment is found, which can be practiced by the majority, as well as by just a few skillful men, who may enjoy the patronage of the very rich. Dr. Burgard's reference to Dr. Buckley, however, read alone, as he writes it, might lead some to believe that Dr. Buckley would approve the use of a paste for sealing small root canals, whereas it would seem that Dr. Buckley's real position is, that one should endeavor to cleanse and fill all canals in the regulation manner, and it is only in the rare cases where it is found to be impossible to enter a canal that the treatment quoted is recommended. To give Dr. Buckley opportunity to express himself on this subject Dr. Burgard's reference was sent to him for reply. He was likewise asked to express his views upon the addition of iodoform to euca-percha. He replies as follows:



"I DISLIKE VERY MUCH to place myself on record in connection with so important a proposition as the removal of pulps from, and the filling of small canals, in a letter dictated off hand. The better way for me to reply to your inquiry is to copy from my book under the heading 'Filling Small Canals,' page 325.* If anyone can read into it what you have quoted from the Louisville dentist, then I said what he has quoted. Whatever I said, properly interpreted, I wish to say again; for I have just reread it and am still of the same opinion.



"**FILLING SMALL CANALS.**"—In filling all canals where we can enter nicely with a smooth broach, it is best to follow the technic outlined above, using a cone which will enter the canal. However, much we may regret it, there are canals, especially in the molar teeth, so small and tortuous that even a fine, smooth broach will not enter, at least, to any depth. It is useless to try to fill such canals with a gutta-percha cone. The methods of enlarging the canals by the use of acids and caustics, as referred to in connection with the destruction of pulp tissue in such canals, can be employed; but it is not always advisable to enlarge them sufficiently to admit a small cone. After the larger canal or canals in a multi-rooted tooth are filled in the ordinary manner, the smaller ones can be moistened with euca-percha compound, and this worked up or down into the canal. This process should be kept up for some time. The sides of the pulp chamber can now be moistened with eucalyptol compound and a piece of base plate gutta-percha, selected and softened in the flame, can be packed into the pulp chamber, when pressure can be made toward the small canals and the plastic gutta-percha forced into

*First Edition (1909).

- ❖ them. This is much better practice than simply filling the mouth of the canal with a gutta-percha cone. If the canal is so small and tortuous that even a small broach will not enter, and if it cannot be enlarged by the use of acids or caustics, as referred to previously, it is good practice to make a paste of formocresol and thymolized precipitated calcium phosphate, placing the paste over the mouth of the canal, and, after working, fit it up or down as best we can, covering it with cement.



"AS PREVIOUSLY MENTIONED, there are many methods of filling root canals by which good results are attained. The method here outlined has served the author well. In closing, I desire to say that no reasonable amount of time should be considered lost in the treatment of teeth preparatory to the insertion of the final root canal filling. Under 'Pressure Anesthesia,' on page 281, in connection with the removal of the pulp tissue in small canals I said:



"SMALL CANALS.—There are many canals so small and tortuous that even a fine broach will not enter, to any depth at least. In these cases, after the hemorrhage from the larger canals has been checked and the blood removed, the pulp tissue in the small canals can be disorganized by the use of strong solutions of mineral acids or alkalies. The author prefers making a paste of sodium dioxid and absolute alcohol, placing the paste in the pulp chamber over the small canals, and working it down as far as possible with a smooth broach. The alcohol gradually evaporates, when the sodium dioxid can be decomposed into oxygen and caustic soda by placing a pledget of cotton in the cavity moistened with distilled water. After the reaction has taken place, the alkali can be neutralized with a weak solution of sulphuric acid (two per cent.). This process can be repeated until the desired end is attained. There are other means by which the same results can be accomplished, such as the use of a fifty per cent. solution of chemically pure sulphuric acid, strong solutions of potassium or sodium hydroxid, or a mixture of metallic potassium and sodium (Schreier's paste). These same agents can be used to advantage for the purpose of disposing of a remnant of a pulp in larger canals. It is not safe to anesthetize this remnant by means of pressure. The only cases on record to my knowledge, where toxic symptoms have resulted from the removal of a pulp by pressure anesthesia, followed an attempt to anesthetize a remnant of a pulp or in making the second application of the anesthetizing solution.



"I NOTICE I DID NOT reply to the latter part of your letter relative to the addition of iodoform to euca-percha. If you have my book you will notice that the formula for my Euca-percha Compound contains besides base-plate gutta-percha, eucalyptol, menthol and thymol. I have either a pharmacal or a therapeutic reason for each of these ingredients being in the preparation. You may know that had I felt that iodoform or other agents would add to the efficacy of the remedy, such would have



Around the Table

❖ been added. I know why men feel like adding such agents. It is with
❖ the blind thought that they make the remedy 'permanently antiseptic.'
❖ The sooner the members of our profession learn that there is no such
❖ thing, so far as I know, at least, and I think I know something about
❖ drugs, as a permanently antiseptic root canal filling material, the better
❖ it will be for all concerned. Our profession has listened to the siren calls
❖ of manufacturers of root canal filling materials, most of which are zinc
❖ oxid-formalin pastes, and this phrase 'permanently antiseptic' has been
❖ a catchy one, and has resulted in 'selling the goods,' which is as far, I
❖ am sorry to say, as many manufacturers are concerned."



IN MEMORIAM



American Academy of Dental Science.

Boston, Massachusetts.

Memorial to Dr. James Truman.

Professor James Truman, one of the most distinguished of the associate members of the American Academy of Dental Science, died at his home in Philadelphia, November 26, 1914, in the eighty-eighth year of his life. The loss of Professor Truman will be deeply mourned wherever dentistry is practiced. He was one of the founders of his profession, and one of the best exponents of its larger possibilities. He was also one of our foremost teachers, and the students who sat under his instruction revered him as they would a father. All who came in contact with Dr. Truman realized the exalted nature of the man and his nobility of character, his love of mankind and his charity for all. His was a fully rounded life, beginning early with large promise, equaling every anticipation in its maturity, fertile and beautiful to its close in the ripeness of its well-filled years.

Dr. Truman began the study of dentistry with his father, who was both a dentist and a physician. He graduated at the Philadelphia College of Dental Surgery in 1854. In 1864 he accepted the position offered him as demonstrator-in-chief of operative dentistry in the college from which he graduated. In 1865 Dr. Truman was elected to fill the chair of Dental Physiology and operative dentistry in the Pennsylvania Dental College, and he held that position until 1870, when he resigned. He was the editor of the *Dental Times* during this professorship, and during the four years of its existence the productions of his pen were published in this journal. On account of his health, he went to Germany and settled at first in Frankfort, practicing a year there. He then went to Hanover, and had among his patients many of the nobility and the wealthy residents of that province. In 1880 he returned to America and began practice in Philadelphia again. In 1882 he was elected Professor of Dental Pathology, Therapeutics and Materia Medica in the Department of Dentistry of the University of Pennsylvania. In 1883 he was made Secretary, and subsequently Dean, which position he held until he retired in 1896. In 1890 he was the editor of the *International Dental Journal*, and he held that position until the publication ceased in 1905. He received the degree LL.D. from the University of Pennsylvania in 1904.

IN MEMORIAM

Professor Truman was one of the pioneers of organized professional dentistry and brought to the solution of this problem a commanding personality, a vigorous and at times an aggressive intellectuality, a masterful command of language, and a dignity and forcefulness of mind which inevitably carried conviction to his hearers. We feel that no tribute to his memory can be too generous or too universal. Therefore, be it

Resolved, That in the death of Professor Truman, the American Academy of Dental Science loses one of its most distinguished fellows, who has been a signal honor to his profession, whose life was full of simplicity, tenderness and personal charm, whose advanced years were as beautiful as his manhood and his youth, a man who was loved wherever known.

R. R. ANDREWS,
EDWARD C. BRIGGS,
T. O. LOVELAND,
Committee.

Memorial to Dr. Louis Jack.

Dr. Louis Jack, a distinguished associate fellow of the American Academy of Dental Science, died at his home at Moyland, Pa., near Philadelphia, on December 9, 1914, in his eighty-third year. He was born at Germantown, a suburb of Philadelphia, March 26th, 1832, and enjoyed a practice of fifty-four unbroken years in his chosen profession.

At an early age he was taken by his parents to Beaver County, Pa., where he received his preliminary education at the Bridgewater Academy. At the age of twenty he returned to Philadelphia to look around to see what he might find to do, and soon decided to take up the study of dentistry. He first became associated with Dr. William R. White, in whose laboratory he was employed, and afterwards with Dr. C. C. Williams. It was at this time that he learned that the Philadelphia College of Dental Surgery, the first school in Pennsylvania to teach dentistry, was about to open its doors to students, and he was the first matriculate to register (September 2, 1852). He graduated in a class of nineteen on the twenty-eighth day of February, 1854.

Soon after graduating he opened his first office in the house of Dr. Robert Arthur and was closely associated with him. It was during the winter of 1855 that the cohesive property of gold foil was first brought to light in Dr. Arthur's laboratory.

He was instructor at the college for several years after his graduation, and in 1857 moved his office to Germantown, within a stone's throw of the spot where he was born, and in 1864 he returned to the city proper, where he remained until his retirement in 1908.



For several years during the early seventies he devoted much of his time after office hours to the construction of an electric mallet. This invention he gave to the dental profession, and for this act the Odontographic Society of Pennsylvania presented to him a testimonial of thanks for his "Professional Liberality and Loyalty to Professional Ethics."

He early recognized the importance of a good and lasting school for the teaching of dentistry in this country, was of the first to urge the institution of such a department at the University of Pennsylvania, and was instrumental in the formation of that department in 1877, and in which he was an occasional lecturer.

He was the "father member" of the Philadelphia Dental Club, having been a member covering a period of forty-two years, from its origin in 1872 until the time of his death.

He was interested in the development of the *International Dental Journal*, and was for a time president of the corporation which owned and published it. He was a member of the National Dental Association, the American Academy of Dental Science, the Odontographic Society of Pennsylvania, the Odontological Society of Pennsylvania, the Pennsylvania State Dental Society, the Academy of Stomatology, and the Philadelphia Dental Club.

Dr. Jack was the last survivor of the class of 1854 of the old Philadelphia College of Dental Surgery. He was a classmate of Professor James Truman, who died in Philadelphia only a month before.

Dr. Jack was a man of unusual ability, a gentleman of the highest character, dignified and refined. He was a sturdy advocate of all that was best in his profession. The hand of an artist showed itself unmistakably in everything he did. His skill as an operator gave to him an international reputation. The Academy honors the memory of Dr. Louis Jack, and sorrowfully adds one more illustrious name to its memorial records.

He did much to make our profession what it is to-day, one of the great ameliorating agencies of modern civilization.

He was not untimely taken. His life was prolonged many years, happy and famous.

We look upon his distinguished attainments with feeling of gratitude and appreciation. No man ever exercised a more genial personal influence over his friends, and those who knew him best realized the exalted character of the man and loved him. Therefore, be it

Resolved, That in the death of Dr. Louis Jack the Academy mourns one of its distinguished fellows, who has ever been an honor to his profession, and we deem it fitting to make a record of our sense of sorrow at his loss.

ROBERT R. ANDREWS,
CHARLES A. BRACKETT,
EUGENE H. SMITH,
Committee.



Dr. J. N. Crouse.

At the annual meeting of the Dental Protective Association, held in December, 1914, being the first meeting subsequent to the death of Dr. Crouse, a committee was appointed to prepare for publication a statement which might serve to show the appreciation of the members of the Association for the character and great services to the dental profession of Dr. J. N. Crouse, who organized the Association and was its president and executive head until shortly before his death.

Dr. Crouse displayed great ability and tremendous force of character, and enthusiasm and perseverance which finally overcame the general indifference and much active opposition of the dental profession, and won a sufficiently numerous membership in the Protective Association to provide enough funds to resist successfully the claims of the Crown and Bridge Company. The defense was so complete that the Crown and Bridge Company never collected anything of consequence from the dental profession. If the dentist had been obliged, for a year or two at first, to pay the licenses demanded by the Crown Company, as they had previously done for many years to the Goodyear Dental Vulcanite Company, the great services rendered by Dr. Crouse through the Dental Protective Association would have been universally acknowledged. As it was, appreciation for his services was less in evidence than a persistent and essentially unfair complaint and criticism of Dr. Crouse personally, and of his management of the affairs of the Protective Association. It did not seem to be understood that a plan of organization similar to that of our dental societies is not well adapted to fight a legal battle. It was indispensable, as in war, that one man should be in supreme command, able to choose his own helpers and subordinates, and to command the entire resources of the association for instant action whenever necessary. So far as appears, there was no other man in the dental profession who had the ability and the willingness to make the personal sacrifices necessary to accomplish what he did. The value of his services to the profession can never be known; that it amounted to millions of dollars there is no room to doubt.

Dr. Crouse always took an active interest in the welfare and progress of his profession, and for many years he was a familiar figure to all who attended dental society meetings anywhere. He came to Chicago from Mount Carroll, where he was then practicing, to become one of the charter members of the Illinois State Dental Society, and for some time before his death he was the only surviving charter member who had maintained his membership continuously. He was active in the administrative affairs of the three principal societies to which he belonged; the Chicago Dental



Society, the Illinois State Dental Society, and the American Dental Association (which was merged into the present Dental Association). He was President of each of them, and was for many years a member of the Executive Committee of the American Dental Association.

The last important service to the Dental Protective Association was the arrangement with Dr. Taggart, by which the members of the Association received licenses under his patents for a trifling sum (less than a dollar a year for the terms of the patents). In this he had the active assistance of the other directors, Dr. C. N. Johnson and Dr. J. P. Buckley, and without all three of them the plan probably would have failed.

Dr. Crouse did not receive in his lifetime the honor and appreciation from his profession that his great services deserved, and which undoubtedly will be accorded to him in the future. He will have a place among the great benefactors of the dental profession.

J. E. HINKINS,
C. E. BENTLEY,
EDMUND NOYES (Chairman).

Dr. James Leslie Taylor.

Memorial Resolution Passed by the Dubuque Dental Society.

Whereas, Our Heavenly Father has seen fit to remove from this sphere of earthly labors our esteemed friend and President, James Leslie Taylor; therefore, be it

Resolved, That this Society deeply mourns the loss of one of its most cherished charter members; one who ever displayed a kindness of nature and generosity of heart which will always be remembered with the warmest of affection.

Resolved, That this Society extends its heartfelt sympathy to the widow, relatives and friends.

Resolved, That these resolutions be spread on the minutes of this Society and published in the home papers and the dental journals, and a copy be forwarded to his widow.

D. J. HEISEY,
J. A. MESHINGER,
G. W. HOAG.



National Society Meetings.

AMERICAN SOCIETY OF ORTHODONTISTS, San Francisco, Cal., August 30, 1915.

Secretary, Dr. F. M. Casto, 1520 Rose Bldg., Cleveland, Ohio.

PANAMA-PACIFIC DENTAL CONGRESS, San Francisco, Cal., August 30 to September 9, 1915.

Secretary, Dr. Arthur M. Flood, 240 Stockton St., San Francisco, Cal.

State Society Meetings.

ARIZONA STATE DENTAL SOCIETY, Phoenix, Ariz., November, 1915.

Secretary, Dr. J. L. O'Connell, Phoenix, Arizona.

MONTANA STATE DENTAL SOCIETY, Helena, Mont., July 15-17, 1915.

Secretary, Dr. F. W. Adams, Chicago Block, Billings, Montana.

NEW JERSEY STATE DENTAL SOCIETY, Asbury Park, July 21-24, 1915.

Secretary, Dr. John C. Forsyth, 430 E. State St., Trenton, N. J.

NEW MEXICO STATE DENTAL SOCIETY, Albuquerque, N. M., date will be announced later.

Secretary, Dr. J. J. Clarke, Artesia, N. M.

OHIO STATE DENTAL SOCIETY, Columbus, Ohio, December 7-9, 1915.

Secretary, Dr. F. R. Chapman, 305 Schultz Bldg., Columbus, Ohio.



SOUTH DAKOTA STATE DENTAL SOCIETY, Rapid City, S. D., July 22-24, 1915.

Secretary, Dr. T. E. Johnson, Rapid City, S. D.

UTAH STATE DENTAL SOCIETY will meet in San Francisco, Cal., during the Panama-Pacific Dental Congress in August, 1915.

Secretary, Dr. E. C. Fairweather, Boston Bldg., Salt Lake City, Utah.

VIRGINIA STATE DENTAL ASSOCIATION, Richmond, Va., Nov. 4-6, 1915.

Secretary, Dr. C. B. Gifford, Norfolk, Va.

WISCONSIN STATE DENTAL SOCIETY, Oconomowoc, Wis., July 13-15, 1915.

Secretary, Dr. O. G. Krause, 1209 Wells Bldg., Milwaukee, Wis.

F. D. I.

The next meeting of the International Dental Federation will be held September 2-3, 1915, at San Francisco, Calif.

Headquarters will be at the Clift Hotel.

TRUMAN W. BROPHY, President.

BURTON LEE THORPE, Assistant Secretary.

3605 Lindell Blvd., St. Louis, Mo.

American Society of Orthodontists.

There will be a meeting of the American Society of Orthodontists held Monday, August 30, 1915, at 9:30 A.M., at San Francisco, in the room assigned the orthodontia section of the Panama-Pacific Dental Congress. It is respectfully requested that as many members of the American Society of Orthodontists, as possible, be present.

F. M. CASTRO, Secretary-Treasurer.

F. C. KEMPLE, President.

Panama Pacific Dental Congress.

The Committee of Organization of the Panama-Pacific Dental Congress desires to call the attention of the members of the dental profession to the fact that the Congress will convene on time in San Francisco, on August 30th, under most favorable conditions for holding a large and successful meeting.

The program of papers and clinics is almost complete, and covers in a most comprehensive manner practically every subject pertaining to the practice of dentistry and oral surgery. About one hundred papers and two hundred and fifty clinics, or more, will be presented. Among the leading essayists and clinicians will be: Drs. Truman W. Brophy; H. S. Dunning; M. H. Cryer; C. H. Oakman; Rudolph Weiser, Vienna, Austria; A. B. Baer; T. B. Hartzell; H. M. Sherman; T. E. Carmody; W. H. G. Logan; H. P. Carlton; Prof. Bornsdorff, Finland; E. F.



Society Announcements

Leffler; Garrett Newkirk; Herbert L. Wheeler; Louis Ottofy; Guy S. Millberry; M. L. Ward; I. N. Broomell; H. E. Friesell; V. A. Latham; F. B. Noyes; Josef Novitsky; C. H. Wilson; F. W. Hergert; C. J. B. Engstrom; V. E. Mitchell; Hart J. Goslee; J. Leon Williams; Alfred P. Rogers; A. H. Ketcham; E. L. Stanton; Weston A. Price; Louis Subirana, Madrid, Spain; R. Ottolengui; M. L. Rhein; H. A. Pullen; Vincenzo Guerini, Naples, Italy; Joseph Nalin, Montreal; W. H. Fitzgerald; Chas. McManus; C. O. Simpson; M. J. Congdon; R. B. Giffen; H. C. Chappel; Th. Weber, Finland; A. C. Wherry, John V. Conzett; F. W. Gethro; Edwin R. Kibler; Richard H. Riethmuller; T. Sydney Smith; Robin Adair; H. Page Bailey; Wm. A. Capon; L. P. Haskell; Jules J. Sarrazan; V. H. Jackson; W. H. O. McGehee; Arthur C. Peck; E. A. Bogue, and many others.

As far as possible no night sessions of the Congress will be held, leaving the evenings free for entertainment and the Exposition.

Over 1,200 front feet of space will be occupied by the leading dealers and manufacturers of the world with one of the most comprehensive exhibits of dental and pharmaceutical goods ever shown.

All the sessions of the Congress, the meetings of the sections, component societies and the exhibits will be held under one roof, in the Municipal Auditorium, one of the most magnificent structures of its kind, affording every opportunity for the effective and comfortable presentation of the program.

The Committee of Organization is sparing neither time, labor nor money to make the Congress the most notable event of its kind in the history of dentistry. To have missed it will be the regret of a lifetime. Transportation and hotel accommodations will be within the reach of all, and should be secured at once. Over 1,000 applications for membership are now on file with the Committee. Those who have not filed their application should do so now, so that arrangements may be made for their accommodation and entertainment.

No one interested in the history, progress and practice of dental science can afford to miss this great opportunity to attend the congress, and at the same time visit the greatest International Exposition the world has ever seen.

ARTHUR M. FLOOD, *Secretary.*

The Conr.

The Transportation Committee of the Panama-Pacific Dental Congress has endeavored to furnish schedule of train service which will afford the greatest amount of comfort, sight-seeing and pleasure, with the least amount of fatigue and inconvenience at a minimum of expense for all those coming from Eastern points. In order to meet the desires of the dentists, their families and friends wishing to attend this Congress, we have deemed it best to adopt the following schedules:

Lv. Boston 12:00 Midnight Aug. 22nd Via N. Y., N. H. & H. R. R.
Ar. New York 7:00 A.M. " 23rd

Change from Grand Central to the Pennsylvania Station.

Items of Interest

Lv. New York	2:04 P.M.	Aug. 23rd	Via Pennsylvania R. R.
" Newark	2:27 P.M.	"	"
" Philadelphia	4:31 P.M.	"	"
" Harrisburg	7:25 P.M.	"	"
" Altoona	11:00 P.M.	"	"
" Pittsburgh	1:35 A.M.	24th	"
" Columbus	7:00 A.M.	"	"
" Logansport	1:15 P.M.	"	"
Ar. Chicago	5:00 P.M.	"	"

Train to be switched to Chicago & Northwestern Station. A few hours for sight-seeing and recreation in Chicago.

Lv. Chicago	10:45 P.M.	Aug. 24th	Via Chicago & Northwestern
" Cedar Rapids	6:00 A.M.	" 25th	" "
" Marshalltown	8:18 A.M.	"	"
" Ames	9:50 A.M.	"	"
Ar. Omaha	3:45 P.M.	"	"
Lv. Omaha	4:20 P.M.	"	" Union Pacific Railway
" Grand Island	8:20 P.M.	"	" "
Ar. Denver	7:30 A.M.	26th	" " "
Lv. Denver	7:45 A.M.	"	" Denver & Rio Grande
Ar. Colorado Springs	10:30 A.M.	"	" "

Spend day and night here for sight-seeing.

Lv. Colorado Springs	10:55 A.M.	Aug. 27th	Via Denver & Rio Grande
" Royal Gorge	1:50 P.M.	"	" "
" Glenwood Springs	10:10 P.M.	"	" "
Ar. Salt Lake City.....	12:01 Noon	28th	" " "
Lv. Salt Lake City.....	1:45 P.M.	"	" Western Pacific Ry.
Lv. Feather River Canyon..	7:00 A.M.	29th	" " "
Ar. San Francisco	5:45 P.M.	"	" "

PASSENGERS FROM FOLLOWING POINTS SHOULD LEAVE AS FOLLOWS TO JOIN SPECIAL TRAIN.

Lv. Washington	3:10 P.M.	Aug. 23rd	Via Pennsylvania R. R.
" Baltimore	4:20 P.M.	"	"
Ar. Harrisburg	6:40 P.M.	"	"
Lv. Louisville	8:20 A.M.	" 24th	" "
" Indianapolis	11:40 A.M.	"	"
Ar. Chicago	5:40 P.M.	"	"
Lv. Dayton	9:05 A.M.	"	"
Ar. Chicago	5:40 P.M.	"	"
Lv. Cleveland	7:20 A.M.	"	" Lake Shore Railway
" Toledo	10:05 A.M.	"	" "
Ar. Chicago	4:00 P.M.	"	" "
Lv. Buffalo	11:00 P.M.	23rd	" " "
Ar. Chicago	11:50 A.M.	24th	" " "
Lv. Detroit	12:30 P.M.	"	" Michigan Central Ry.
Ar. Chicago	7:40 P.M.	"	" "
Lv. Minneapolis	10:05 P.M.	"	" Chicago & Northwestern
" St. Paul	10:40 A.M.	"	" "
" Sioux City	7:50 A.M.	25th	" " "
Ar. Omaha	11:25 A.M.	"	" "
Lv. Des Moines	8:30 A.M.	"	" "
Ar. Ames	9:35 A.M.	"	" "
Lv. St. Louis	Evening	24th	" Any Line
" Kansas City	Evening	"	" "
Ar. Omaha	Morning	25th	" " "

Society Announcements

Railroad Fares.

Going via the route of the Official Train to San Francisco, Cal., thence returning via any direct line from California, rates will be as follows:—From Boston, \$106.75—From New York City, \$98.80—From Philadelphia, \$95.20—From Chicago, \$62.50. Going via route of Official Train to San Francisco, thence to Los Angeles and returning via North Pacific Coast (Portland, Seattle or Vancouver), the cost will be \$17.50 higher (destination of tickets, San Francisco), with an additional charge of \$4.00 if side trip Los Angeles to San Diego and return is desired. The entire route must be selected at the time tickets are purchased. Correspondingly low rates from your home station.

Sleeping Car Rates to San Francisco.

From	Lower	Upper	Compartment	Drawing Room
New York City.....	\$18.00	\$14.40	\$50.50	\$63.00
Philadelphia	17.50	14.00	49.00	62.00
Chicago	13.00	10.40	36.50	46.00
Omaha	11.00	8.80	31.00	39.00

GENERAL INFORMATION.

In order to secure sleeping car accommodations it will be necessary to make application as soon as possible.

On account of the heavy travel it would be advisable to make hotel reservations in advance, and these can be secured through the Official Exposition Hotel Bureau, Flannery Building, San Francisco, Cal.

Literature descriptive of the route of travel, the Expositions, etc., will be sent you on request.

Any of the representatives noted below will be pleased to assist in arranging your trip and make whatever sleeping car reservations you may require.

REPRESENTATIVES: CHICAGO & NORTHWESTERN LINE.

Boston, Mass., 322 Washington St., J. E. Brittain, Gen. Agt.
Buffalo, N. Y., 301 Main Street, H. B. Loucks, Jr., Gen. Agt.

Itineraries of National Dental Association.

The members of the Transportation Committee of the National Dental Association, adopted three official railway routes and schedules to San Francisco from the East, and are now engaged in calling the attention of the profession to the schedules planned. Members of the committee are located in different sections of the States, and are prepared to give members of the profession in their localities, general information regarding the railway routes, fares, etc.

The railway trains scheduled as arranged by the committee going to San Francisco have special equipment and train service. The routes are popular, the trains are of the most comfortable cars; the arrangements being complete, insures pleasant associations and encourages good fellowship.

The Railway Itinerary of the official trains as published in the February number of the ITEMS OF INTEREST, page 154, should be examined carefully by all who are intending to make the trip, as the plan adopted in employing our special and official trains is to encourage comfort in transit and general good fellowship. The committee suggests that one should confer with his local railway agent, or one of those that are referred to, in our itineraries, and choose a route for the return trip, which is necessary before purchasing a reduced fare ticket.

The committee request that editors of all dental journals, officers of State and local dental societies and all members of the profession do what they can to interest members of the profession in joining us in our trip to attend the Congress, and in that manner add to the attendance and assure the success of the Congress.

TRANSPORTATION COMMITTEE, NATIONAL DENTAL ASS'N.

- Dr. Victor H. Jackson (Chairman), 40 E. 41st St., N. Y.
Dr. H. F. Hoffman, 324 Metropolitan Bldg., Denver, Colo.
Dr. Jos. D. Eby, 509 Fourth National Bank Bldg., Atlanta, Ga.
Dr. D. C. Bacon, Columbus Memorial Bldg., Chicago, Ill.
Dr. Henry W. Weirick, 503 Mechanics Bldg., San Francisco, Cal.
Dr. J. P. Marshall, 7401 Hazel Ave., St. Louis, Mo.

Examination of Dentists for the U. S. Army.

The Surgeon General of the Army announces that examinations for the appointment of Acting Dental Surgeons will be held at Fort Slocum, New York; Columbus Barracks, Ohio; Jefferson Barracks, Missouri; Fort Logan, Colorado; and Fort McDowell, California, on Monday, October 18, 1915.

Application blanks and full information concerning these examinations can be procured by addressing the "Surgeon General, U. S. Army, Washington, D. C."

The essential requirements to securing an invitation are that the applicant shall be a citizen of the United States, shall be between twenty-one and twenty-seven years of age, a graduate of a dental school legally authorized to confer the degree of D.D.S., and shall be of good moral character and habits.

Acting Dental Surgeons are employed under a three years' contract, at the rate of \$150.00 per month. They are entitled to traveling allowances in obeying their first orders, in changing stations, and in returning to their homes at termination of service. They also have a privilege of purchasing certain supplies at the Army commissary. After three years' service, if found qualified, they are promoted to the grade of dental surgeon with the rank of first lieutenant, and receive thereafter the pay and allowances appertaining to that rank.



Society Announcements

In order to perfect all necessary arrangements for the examination, applications must be in the possession of the Surgeon General at least two weeks before the date of examination. Early attention is therefore enjoined upon all intending applicants. There will be twelve vacancies to be filled.

ROBERT E. NOLB, Major, Medical Corps, U. S. Army.

New Jersey State Board of Registration and Examination in Dentistry.

Advance Notice.

At the meeting of the State Board of Registration and Examination in Dentistry, to be held at the State House, Trenton, N. J., December 6, 7, 8, and 9, 1915, the following practical tests will be required:

Insertion of an approximal gold filling, compound approximal amalgam filling and a silicate filling, besides a practical test of the applicant's ability in oral prophylaxis. Also preparation of a cavity for an inlay with wax pattern.

Prosthetic dentistry. Five-piece bridge and Richmond crown in addition to an anatomical articulation of a full upper and lower set of teeth. Teeth to be furnished by applicant. Wax bites properly trimmed and in place on models for inspection before setting up teeth.

In addition, dental jurisprudence and bacteriology will be added to the theoretical examination.

In accordance with the above law, the Secretary will issue application blanks to applicants only upon presentation of the required certificate from the Superintendent of Public Instruction, Trenton, N. J.

Applications must be filed complete ten days before the date of the examination.

Address all communications for further particulars to

JOHN C. FORSYTH, Acting Secretary,
430 E. State Street, Trenton, N. J.

VERNON D. ROOD, D.D.S., Secretary.

Dental Red Cross Fund.

At the meeting of the American Institute of Dental Teachers, held at Ann Arbor, Michigan, on January 26th, it was decided to take steps that should result in the raising of a fund to be used through the Red Cross Society in giving relief and aid to the soldiers in Europe who are suffering from oral and dental injuries. The President was instructed to appoint a committee to take charge of this matter. President F. W. Gethro, under this instruction, appointed the following Executive and General Committees:

**Items of Interest**

Executive Committee—Henry W. Morgan, E. A. Johnson, Ellison Hillyer, John F. Biddle, Secretary; C. R. E. Koch, Chairman.

General Committee:

E. C. Kirk, Philadelphia	H. E. Friesell, Pittsburgh
J. H. Kennerly, St. Louis	Henry W. Morgan, Nashville
H. C. Miller, Portland, Ore.	I. N. Broomell, Philadelphia
D. M. Gallie, Chicago	Wallace Wood, New Orleans
John F. Biddle, Pittsburgh	Frank T. Breene, Iowa City
E. T. Darby, Philadelphia	H. L. Banzhaf, Milwaukee
Alfred Owre, Minneapolis	J. G. Sharp, San Francisco
B. Holly Smith, Baltimore	G. V. Black, Chicago
E. A. Johnson, Boston	W. T. Chambers, Denver
Frank Holland, Atlanta	H. M. Seamans, Columbus
D. M. Cattell, Memphis	J. D. Patterson, Kansas City
Frederick R. Henshaw, Indianapolis	N. S. Hoff, Ann Arbor
S. W. Bowles, Washington	C. N. Johnson, Chicago
E. H. Smith, Boston	H. L. Wheeler, New York
A. H. Hippel, Omaha	L. E. Ford, Los Angeles
Ellison Hillyer, New York	C. R. E. Koch, Chicago
Truman W. Brophy, Chicago	H. B. Tileston, Louisville
D. H. Squire, Buffalo	

The Executive Committee is contemplating the issue of contribution certificate booklets. Each booklet will contain twenty (20) certificates or coupons certifying that the holder thereof has contributed 25 cents to this fund. This certificate will be neatly lithographed, something like national currency. It will be printed in lilac ink—the color of the dental profession—and bear upon its face the Red Geneva cross.

It is hoped that the dental schools, dental students and dental societies, as well as the profession at large, will become sufficiently interested in this propaganda to secure a large enough fund, through these small contributions, to secure real relief for the class of war sufferers for which it is designed. That it may aid in the establishment of several special hospitals or wards devoted to dental and oral surgery injuries, within the belligerent zone of Europe, is the ultimate purpose of this movement.

It is expected that these booklets will be ready for distribution on or before March 1st. Applications for them may be made to Dr. John F. Biddle, of Pittsburgh, Pa., Secretary of the Executive Committee, or to Dr. C. R. E. Koch, 31 West Lake Street, Chicago, Chairman of the committee, before March 1st. After that date all the members of the Executive Committee and General Committee will be in a position to supply them.



Exclusive Contributions

- Operating Without Pain.
F. W. BARBOUR, D.D.S., Fredericton, N. B. 561

Society Papers

- Root Canal Preparation.
J. R. CALLAHAN, D.D.S., Cincinnati, Ohio 567
- Rosin Solution.
DR. J. R. CALLAHAN, Cincinnati, Ohio 579

Exodontia

- Wisdom Teeth.
JOHN D. THOMAS, D.D.S., Philadelphia, Pa. 590

Society Discussions

- Second District Dental Society. Discussion on Dr. Callahan's Paper 598
- Second District Dental Society. Discussion of Dr. Best's Paper 606

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- Review of Articles and Discussions on Root Canal Treatment 627

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Subscription, \$1.00 per year, in advance, to United States, Mexico, Cuba, Panama and other American territorial possessions. Canada, \$1.40. Other countries, \$1.75. Single copies of this issue, 15 cents (Domestic).

Subscriptions received at any time, to date from January or July. Orders taken by all leading dental dealers. Advertising rates made on application Remittances preferred by registered letter, postal money order or bank draft.

Notification of change in address should be made on or before the 10th of the month, in order to have change made in time for the following month's issue.

Address all business communications to Consolidated Dental Mfg. Co., Publishers, Nos. 130, 132, 134 Washington Place; 187, 189, 191 West Fourth St., New York.

NEW YORK. Communications for publication department should be addressed to the Editor, R. Ottolengui, M.D.S., D.D.S., LL.D., 80 West 40th St., New York.



Operating Without Pain.

By F. W. BARBOUR, D.D.S., Fredericton, N. B.

A desire to lessen pain is one that is natural to all, and the dental profession is surely not the exception. Any feasible and at the same time proved method that will bring to our equipment a means to this end is gratefully taken advantage of. This should not be because of any pecuniary advantage that might accrue to the operator, but rather because of the better position in which he is placed to serve those who may commit themselves to his services.

It has been suggested that as pain is believed to be of advantage to us as a strengthener of the physical and moral fibre, conversely the elimination of it from the preparation of cavities for our patients would weaken their powers of resistance and lessen the ability to overcome the control of fear. With the large majority of us it would seem that such an advantage would not stand against a presentation of the advantages accruing from a condition of ease and comfort on the part of the patient.

The reasons for desiring a field of operation that is devoid of pain are almost too obvious to call for enumeration.

**Advantages
of Painless
Methods.**

A little consideration, however, may serve to emphasize the advantages which will accrue through the use of any proven method by which such a condition may be brought about. From the patient's standpoint, the fact that the appeal is so often made

to us to lessen that which so many have come to dread, serves to show how preponderating is that demand on their part. The appreciation that is shown when such a result is attained is practical evidence of a need.

To a very large degree the lack of proper care of the teeth through the services of the dentist is brought about through anticipation. The good which we all so desire to contribute to our fellows would be very largely enhanced if a revised opinion of the objectionable phases of dental work could be developed.

Further value of working without pain would have reflex value to the operator, even to the degree of lengthening his period of service. The majority of us are susceptible unfavorably when we are compelled to operate, and at the same time cause suffering to the one in our charge. We surely, therefore, give welcome to the means that have of late been offered to us that tend to produce to some degree this result. The special attempt in this paper will be to estimate the comparative value of these later accepted methods. Consideration will be given entirely to but two means that are now widely taken advantage of. A third one, that of local anæsthetic injections, has not been found serviceable to the degree requisite to the writer.

Comparison of Analgesia with Buckley's Desensitizing Paste.

Reference is herein confined to the analgesic state that is secured through the administration of nitrous-oxide and oxygen gases, and the effect produced by the application of Buckley's Desensitizing Paste.

This comparison is made after what is believed to be a sufficiently extensive use of both of these preparations.

In the former case it is after a year of use following special instruction, in the latter a strict attention to the details of proper application and sealing in what should be as sufficient number of cases to form a reasonably fair judgment. Without, in the first case, questioning the effectiveness of either, it may be well to consider the advantages and disadvantages of each. Primarily in regard to application. In securing the analgesic state, the complete attention to cavity formation is permissible without delaying to a successive sitting to await effect, and the question of pain existing in the interval need not be considered.

Again it is an advantage that the very small apertures can be dealt



with even more favorably than the large. Where time and conditions afford it is possible to attend to an unusual number of teeth in the one sitting. The opportunity is given to produce and take advantage of anæsthesia where conditions develop that make such a severe proceeding as pulp exposure or removal desirable immediately.

The disadvantages of nitrous oxide and oxygen are readily enumerated. (1.) The fact that certain hours are most suitable for satisfactory service, and some times of the day objectionable. (2.) The advisable and somewhat objectionable preparation of the patient. (3.) The possibility of excitement or nausea interfering. (4.) The inconvenience caused by nose-piece, saliva and sometimes unfavorable situation of the head. (5.) The fear that is sometimes experienced on the part of a patient that is having an initial experience. (6.) On the part of the operator there may be a tendency to undue haste in consideration of the possibility of some unfavorable condition developing.

The writer does not consider the oft stated danger of accidental exposure as a disadvantage. A careful operator taking due regard to the physical and anatomical conditions will run no more risk than in the ordinary procedure.

Referring now to the Buckley Paste.

Buckley's Paste. Its good qualities in regard to application may be stated as follows: A ready acceptance on the part of the patient. A clear field of vision for instrumentation. The continuance of insensibility over a sufficient period to make attention at a later sitting a matter of ease. The opportunity afforded for deliberativeness gives assurance of essential preparation.

This very admirable compound has at the same time conditions sometimes attendant upon it that detract from its value. (1.) The necessity of procuring some retentive form of carious portion of the tooth for its sure sealing is sometimes, to say the least, uncomfortable. (2.) The impossibility of application to minute points of decay, especially when approximately located or if extending beneath the gum margin. (3.) The difficulty of absolute marginal sealing even with the most adhesive cements in some forms of cavities. (4.) The danger of applying to places where caries is more extensive than realized and which should have had applications preparatory to removal of the pulp. (5.) The frequent exhibition of discomfort and sometimes pain during a greater or less amount of time during which the drug is confined. (6.) The oversensitiveness of some teeth for a period beginning some days after the completion of the work. These comparisons made between these two methods have not as yet taken into consideration the effectiveness of either. Such consideration will now be given basing statements upon results attained

through the year's experience with analgesia and in seventy-five cases in which the paste has been applied. In connection with the former a wide range of patients of diverse types have presented, an assistant rendering service and an earnest endeavor being made to attain the most satisfactory results.

In using the paste great care was manifested to follow directions, except that Ames C. & B. Cement was used in preference to the temporary cement advised, to assure most positive retention.

Reverting to analgesia and its service, space

**Experiences
with Analgesia.** would not permit complete data, but suffice it to say that in over ninety per cent. of the cases in which it has been undertaken, sufficient success was attained to meet the approval of both patient and operator.

References to cases which have not reached the standard desired or which have developed peculiarities are not without interest and are therefore mentioned.

Male of forty years. Administration an hour

Case 1. after meal. Vomiting after ten minutes of analgesic state. Recovery rapid. Patient claimed that unusual cup of coffee was largely responsible. Only two other patients have had this experience.

Married female, exhibited hysteria in form of

Case 2. loud laughing and talking. This continued all through the experience, but at conclusion no complaints were made.

Nurse; just released from exhausting case; ap-

Case 3. parently suffered intense pain and almost collapsed, but on recovery expressed more objection to drying out of cavity than any part that had preceded it. Three others showed every sign of the usual pain but, while having the memory of it, contended that it was not objectionable and would use no other means at future times.

Was the one case that in spite of almost the ab-

Case 4. solute anaesthetic state yet was just as susceptible to pain, according to the story told.

Was that of a young married woman who in-

Case 5. tended to have the analgesic effect three days in succession, but after the second was nauseated and depressed for several hours, and so preferred the usual methods on the final day. As a result of this experience it is felt that it is wise to let several days intervene between sittings for such a purpose.

No other cases can be referred to that seemed to manifest unusual

results. So far then as effectiveness in regard to the reduction of sensation is concerned, it is stated in all sincerity that the production of the analgesic state is, when carefully administered, qualified to produce almost sure results. Some of the objections such as timidity and the preparation of patient (which latter can be largely anticipated at home), will be gradually done away with as knowledge respecting the process is more widely known.

It should be borne in mind in comparing the two methods dealt with, that nitrous oxide and oxygen is effective very largely in connection with pyorrhea treatment, while, of course, the paste requires a cavity for introduction.

It could also be mentioned along the same line, that in cases where formation is to be made in a sound tooth for an inlay for bridge retention, that it is obvious that paste cannot be applied.

At the same time it has been found an excellent expedient to seal in the paste after the preparation of a cavity with analgesic assistance, when such is to be temporarily filled until a later sitting. Previous to this knowledge it had been found that on return there had often been very objectionable sensitiveness.

The following is a careful review of the cases in which Buckley's paste has been resorted to:

**Experiences
with Buckley's
Paste.**

Seventy-five successive cavities are referred to, dealing, of course, with a lesser number of patients.

Care was used to secure the best results, and at least it can be stated that average ability was shown so that the results are not any less good than would be found by the average workman.

Of the cavities prepared twelve were small approximal cavities in lower incisors, and of these nine showed very poor results. Only one was really effective.

Others approximately located but in other parts of the mouth gave thirty-four successes out of forty.

Buccal or labial efforts were successful in practically sixty per cent. of cases and occlusal apertures where it was possible to attain margins that assured sealing effectively were in every case sure in results.

It was easy to judge that absolute success was most to be expected where the walls were definitely outlined, and where this was very difficult without painful cutting away of margins the outlook was correspondingly doubtful. The small proportion of successes in the lower incisors is accounted for in this way.

It has been noticed and remarked upon by patients that it would seem that a slight discomfort during the interval presages desired results.



Items of Interest

On more than one occasion, particularly in teeth of a mother and son, severe pain was experienced for the better part of twenty-four hours.

In one case, through failure to keep an appointment, the application remained in one tooth for a week and then dropped out, but in spite of being open for another week the results were good. A neighboring tooth, however, in which the application seemed to be still well retained, needed a further dose. Still more remarkable was that of two upper laterals which, through sickness, had retained treatment for five weeks and there was still the desensitizing effect.

On four occasions after removal of caries following the paste, exposure developed, but there had been little discomfort in the interval and seemingly the extirpation of the pulp was facilitated.

So far as permanent deleterious pulp effect is concerned, it is necessary at this date to rely on the assertions of Dr. Buckley, and the writer has confidence that such will not develop or he would not be a user of it at the present time.

The conclusions drawn from an unprejudiced

Conclusions. consideration of the cases dealt with in both of the methods under review, lead to the positive opinion that they are very valuable contributions to both patients and operator, but that neither can be relied upon at all time to perform the desired service.

Each seems to have particularly favorable conditions that anticipate surety of effects, but at the same time each will develop unanticipated failures.

In neither case is overconfidence advisable, and both require carefulness to the last degree.

It has been shown that there are various conditions unfavorable for each, and judicious selection, when either is called for, is necessary.

In cases where there are no cavities existing, or where so minute or inaccessible as to make sure sealing impossible, then it is apparent that resource to paste application is unwarranted.

In cases of unwillingness on the part of the patient, or where physical or mental disability exists, analgesia cannot be proceeded with properly.

There will, therefore, be times when, in spite of both of these admirable expedients, conditions will present when we will be compelled to continue doing the best we can with such other aids as are available.



Root Canal Preparation.

By J. R. CALLAHAN, D.D.S., Cincinnati, Ohio.
Read before the Second District Dental Society, Brooklyn, N. Y.

It is certain that much may be judiciously argued in favor of the drill, or of chemical and mechanical treatment for root preparation, and there is something to be said against each agent or combination of agents, and that is what, on the present occasion, I have to say.

To state one argument is not necessarily to be deaf to all others, and that a man has written a book of travels in Russia is no reason why he should never have been to Africa.

But a comparatively short time ago, before the invention of matches, in the days of our forefathers, neighbor would go to neighbor asking: "Lend us fire." I have traveled hundreds of miles to ask of you, our neighbor: "Lend us fire, to relight and keep our torches burning, to give us courage, to give us patience and endurance and wisdom to the end that we, who are giving the best that is in us to this yet unsolved problem, may be able to report progress in answer to the eager and earnest inquiries of our confrères throughout the world."

Whether it be a tooth from which a devitalized pulp is to be removed after arsenical application or pressure anaesthesia, or the opening and cleansing of a pulp canal that shows a moist or dry gangrenous tissue, or any or more of the numerous pathological pulp condition or conditions beyond the root end, the goal, the strategic point, is the apical foramen or foramina: foramina in ninety per cent. of adult teeth.

It is then the duty of the operator to obtain a sterile and as direct and as free a passage to the strategic point as the nature of the root

canal will permit. It does not meet the present day requirements to say, as do some of our text books and essayists, "open the root canals to the end." Our inquiry is, how is this seemingly simple little thing to be done?

To undertake the opening and preparation of a root canal should indicate that the dentist recognizes the necessity for removing every atom of devitalized tissue, having the canal throughout its entire length and in all of its ramifications, including the dentinal tubuli sterile and in such shape and condition that the canals, the tubuli, the foramina may be permanently sealed or filled.

Diagnosis, filling of canals or treatment of conditions around and about the root, are not to be discussed farther than may be necessary to make clear the reasons for certain steps to be mentioned.

The dentist should on every possible occasion avail himself of the advantage to be obtained through having one or several radiographs before him for comparison or study. We cannot be reasonably sure of the effectiveness of our efforts without such assistance, nor can we be absolutely certain with them. Many of the pictures thrown on the screens and printed in our journals as evidence of perfect technic and results are about as clear as rabbit tracks in the snow on a windy day, when it is a difficult matter to determine whether brother rabbit is going or coming, the strategic point being conspicuously absent. Improved apparatus and technic will some day overcome these shortcomings. Inasmuch as the largest number of dentists are for one reason or another deprived of the valuable assistance of the X-ray, and our literature is being surcharged with most accurate information in this line, let us then on the present occasion keep in mind the great majority who get along the best way possible without this expensive adjunct.

Aseptic Operation Recommended.

All operations upon the root canal from beginning to completion are purely surgical and should be conducted upon surgical principals; this being true, the maintenance of aseptic conditions is of first importance.

Radiated heat and superheated steam in combination is the only acceptable method for the sterilization of instruments, cotton, paper points, gutta percha points, etc.

Steam chests that are best adapted to this use are known as the Pentz System, made by the Santiseptic Manufacturing Co., Tompkinsville, N. J., and a double chambered steam chest made by the Wilmot Castel Co., of Rochester, N. Y.

**Opening into
Pulp Chamber.**

The opening of the pulp chamber should be accomplished with as little disturbance of the devitalized pulp tissue as may be possible: to this end it will be well to cut through the dentin with a drill, then use carborundum disks and stones, keeping the carborundum stones moistened with water that contains a liberal supply of carborundum powder. This enables the stone to cut rapidly without heating the tooth.

Better results will be obtained if, while using the stones and carborundum powder, all of the tooth crown be removed that interferes with pulp chamber enlargements that may be necessary in getting direct access to the end of the root.

Sufficient enamel and dentin having been removed to give a clear view of the pulp chamber, it will be well to prepare for the placing of the rubber dam, by means of threads, fine polishing strips, separators or by whatever means necessary to insure the dam going to place with little or no forcing. There should be no leakage whatever about any of the teeth included in the field of operation.

**Copper Band to
Facilitate Use
of Rubber Dam.**

If the cavity margin reaches to or below the gum line then a copper band should be fitted and cemented to place about that tooth, so that the dam and clamp can be placed upon or over the band and tooth without danger of displacing the band. The fitting and placing of the band will be described with the illustrations that follow this paper.

**Removal
of Pulp.**

The dam being in place, bathe the exposed teeth, rubber dam and clamp, etc., with a seventy per cent. alcohol solution or tinct. iodine. This strength of alcohol is a more effective germicide than the ninety-five per cent. generally used. With warm air dry the cavity: with small fissure drill make a circular cut, leaving a cap of dentin over the pulp chamber which may be removed by a blast of air or a fine excavator. Having exposed the pulp it will in many cases be well to toughen or harden the pulp tissue by placing a drop of alcohol and formalin (about five per cent. formalin) on the devitalized pulp for a few minutes. Then with hot air dry the pulp, when a fine broach is passed along side the pulp or largest branch of the pulp. Slightly turning or rotating the broach and withdrawing the broach, will in many cases bring the entire pulp including the smaller branches of molar pulps.

Every possible effort should be made to get the entire pulp at the first trial. The extracted pulp should be spread on white paper and examined with a magnifying glass that the operator may know the location of pulp fragments if there be any.

**Cleansing
Canals.**

The three methods of procedure, from this point, that we wish to discuss briefly are: the drill, the sodium-potassium, and the sulfuric acid and soda bicarbonate.

The open chamber and canals should first be washed out with normal saline solution; dry, then place shred of cotton saturated with clove oil well within the large or open canal to remain while we go in search of the very minute canals that may be so small that it is a difficult matter to find them.

**Use of
Canal Drills.**

Paint the floor of the pulp chamber with tincture of iodine. When the surplus iodine is absorbed by a cotton pellet little dark spots will, in most cases, reveal the location of the canals. The finest Kerr drill, manipulated by hand, without pressure, will enter a very fine canal by gently rotating the drill, and being very delicate and flexible and threaded like a screw, will in most cases bring away the remaining pulp tissue, when the canal may be enlarged by gradually increasing the size of drills, or the drills may be worked in and out of the canals as files.

These flexible drills will go around a slight curve if the canal is large enough to give the instrument free play. If the instrument binds, at or near the curvature, a false pocket will be made on the outer wall of the canal at the curve. This little pocket or pit in the dentin, at the point indicated, prevents further instrumentation within that canal.

Each and every root canal is more or less of a law unto itself. A correct radiograph is of inestimable value. In the absence of the X-ray picture, the operator will be greatly assisted by making a pencil sketch of the probable shape of the tooth. In this way his memory will be refreshed and he will be made more keen and alert as to the probable difficulties ahead.

In some cases it may be of advantage to sink a shaft in the root using a bud drill, following the fine canal from a third to a half the length of the root, following the canal from this point with the fine flexible drill.

By being patient and careful many of the finer canals may be opened to the foramen.

It is possible, however, that septic matter or pulp fragments that may become septic, have been forced through the foramen into the apical space.

It is not possible that the multiple foramina, or the collateral canals, or the connecting canals or the flat thin cancellous spaces between the main canals in double roots have in any sense been opened or cleansed.

The drills in many such roots have simply drilled holes through or-

ganic substance in various stages of disintegration. Such substances cannot be washed or swabbed out but are left within the canal, sometimes saturated with such antiseptic medicaments as may be applied, and finally incorporated with the root canal filling.

**Sodium-Potassium
Method of
Cleansing Canals.**

Schrier's kalium-natrium, or sodium-potassium as we more frequently name it is a concentrated alkali caustic; explosive when in contact with water, yet a most useful agent when carefully and skillfully handled, for the purpose of removing organic substance from root canals. It is also a useful adjunct for opening and enlarging root canals after the manner advocated by Drs. Rhein and Ottolengui.

If the dentist will moisten a spot of skin on the back of his own hand and place thereon a small particle of sodium-potassium he will realize at once the necessity of giving close attention to the protection of the patient, including the nostrils which should be protected in some way.

All the pulp tissue that is within reach of the broaches having been removed, small particles of the sodium-potassium, size of a pin head if placed where the very fine canals should be, the dentin being moist will, by dissolving the organic substance, reveal the elusive anterior canals of lower molars or buccal canals of upper molars. These canals after being located and having been exposed to the action of the sodium-potassium for a few minutes, should be attacked with what has been named "picks," Dr. Rhein having devised a very efficient instrument under this name. An instrument will be illustrated later that has the advantage of being more rigid and also having interchangeable points.

These picks, with assistance of the sodium-potassium, which breaks down the organic matrix of the dentin, converting it into a soapy-like mass, which acts as a lubricant, will work their way into the canal, enlarging and sterilizing in a most satisfactory manner.

After advancing a distance into the canal, if the pick begins to bind or lock, thereby becoming a piston within the canal, a large Gates-Glidden drill, from which the point has been ground, may be used to enlarge the lumen of the canal so that the pick may work more freely.

When having reached the region of a curve in the canal or a near approach to the foramen, it will be safer to use a finer instrument, a Donaldson broach, from which the barbs have been partially removed, for the purpose of negotiating the curve if possible; also to eliminate as much as possible the piston effect of the larger instrument that might force the caustic contents of the canal into the region beyond the foramen, and do damage that will be difficult to control.

I have had two severe burns in my practice from this cause. In one case the tooth had to be extracted, and the second one I fear will be lost.

Caustics. Chemical substances which cause death and degeneration of tissues are called caustics.

Alkalies, such as sodium-potassium and calcium.

Acids, such as hydrochloric, sulfuric, nitric, arsenious and carbolic, and the salts of some metals, such as silver nitrate, zinc chloride, copper sulphate, are the most common types of caustics.



Fig. 1. Copper band cemented on tooth to facilitate the placing of rubber dam where the cavity extends below the gum margin.

The alkalies and metallic salts act by uniting with the albumins, acting as albumin solvents.

"The caustic alkalies are not self limiting: they penetrate deeply into the tissues and destroy the albumin of the mucous surfaces, the horny tissues and the external skin."

Necrosis, followed by eschar formation, is caused by strong caustics, the necrosis involving tissues at various depths, depending upon the strength of the caustic, the nature or mode of its action, and the time it is allowed to act.

"Those agents are best suited for cauterization which, like concentrated sulfuric and fuming nitric acid and silver nitrate, penetrate to the deeper layers of the skin and mucous membrane only after acting for some time."

The treatment of chemical injuries, of *recent cases*, should be directed toward neutralization of the agent before it penetrates deeply.

Chemists and apothecaries usually have two solutions ready. Acetic acid or vinegar is used to neutralize the alkalies, while a solution of sodium bicarbonate is used to neutralize the acids.

If, for any reason, it is suspected that sodium-potassium has passed beyond the foramen, a sulfuric acid solution should be applied quickly, followed by soda bicarbonate solution.

I have no doubt that through some of the large foramina, at least, the caustic alkali has wrought harm.



Fig. 2.

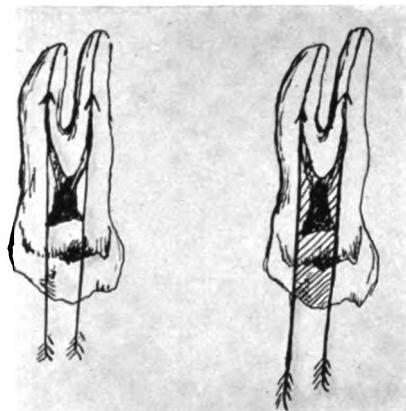


Fig. 3.

Fig. 2. Showing curvature of buccal roots of upper molar.

Fig. 3. Shows amount of tooth structure to be removed to get as nearly as possible in a straight line with the foramen.

In the constricted canals and in the constricted apical region the use of sodium-potassium is frequently indicated. The dangerous qualities of a valuable agent should not cause us to overlook its useful qualities.

Twenty years ago sulfuric acid solution and soda bicarbonate solution came into use.

**Sulfuric Acid
Method of
Cleansing Canals.** The sulfuric acid is used for the purpose of softening the surface of the pulp canal walls to permit the passage of the barbed or roughened broaches to and fro through the canal, enlarging the canal by breaking loose the softened dentin. Soda bicarbonate solution is thereupon injected into the canal that the broken down dentin and other disorganized substances may be removed from the canal by effervescence caused by the escape of carbonic acid gas that is the product of the neutralizing action of the soda bicarb upon the sulfuric acid.

This reaction leaves the canal in a state of surgical cleanliness. This cannot, to my knowledge, be said of any other method or agent.

Twenty years is a long time for a method or theory to stand practically unaltered. Notwithstanding the age of the so-called sulfuric acid treatment (which might much better have been entitled, "Sulfuric acid and soda bicarb treatment"), a brief résumé of the theory and practice of the doctrine may not be amiss.



Fig. 4.

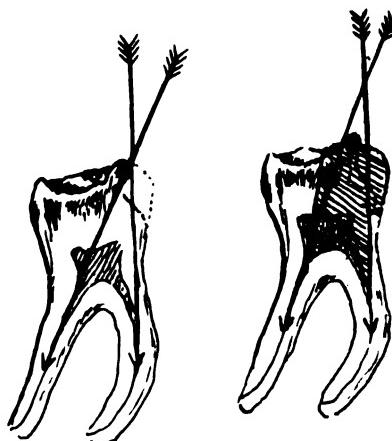


Fig. 5.

Fig. 4. Showing curvature of roots of lower molar.

Fig. 5. Shows the necessity for the removal of a large part or possibly all of the crown of the tooth in order to get by this always difficult and many times impossible class of root curvatures.

Concentrated sulfuric acid is also an active escharotic. The acid caustics act by burning the structure with which they come in contact.

They not only disintegrates albumen but attack many other organic substances. The breaking up of inorganic and the carbonization of organic substances is to be borne in mind.

Diluted and mild caustics, when applied, cause an inflammatory action, depending upon the strength and time of application.

A fifty per cent. (by volume) solution of sulfuric acid will soften cotton on the carrying instrument. A weak acid solution gives a correspondingly weak reaction in the presence of the soda solution.

The strength of the acid solution should be not less than twenty per cent. and not above forty per cent. for root canal work. In my own practice thirty per cent. to forty per cent. aqueous solution or commercial sulfuric acid by volume is the standard.



Soda bicarbonate should be a saturated solution.

In relation to the action of the acid solution on bone tissue, Mr. George Pollack, F. R. C. S. Surgeon to St. George's Hospital, says: "Dilute sulfuric acid does not affect the living, acting chemically on diseased bone alone." He gives the following experiments: "Portions of dead disease and healthy bone were selected and subjected to the action of sulfuric acid."

- viz: No. 1. Dead bone 10 grains
2. Diseased bone 10 grains
3. Healthy bone (middle age) .. 10 grains
4. Healthy bone (old age)..... 10 grains

"Exposed to the action of a mixture of sulfuric acid and water one part in four, for three days, at a temperature of one hundred deg., the following were the results:

- No. 1. Dead bone, phosphate of lime 2 grs. Carbonate of lime 3.3 grs. dissolved in the mixture.
No. 2. Diseased bone, phosphate of lime 2 grs. Carbonate of lime 1.3 grs. dissolved in the mixture.
Nos. 3 and 4. In both specimens of healthy bone no action took place."

Dr. Garretson, in the treatment of caries of the maxilla, recommends the use of the officinal ordinary sulfuric acid.

On the diseased or partially disorganized soft tissues the solution will have a corrosive and astringent effect, or in other words, will break down or destroy the diseased tissue, leaving a fresh, clear field for nature, with the assistance of mild antiseptic treatment, to take care of herself.

Why does not sulfuric acid attack and destroy devitalized dentin? The acid at first attacks the tooth substance, breaking down the lime-salts, at the same time corroding or carbonizing the organic substance, forming a new compound, thereby establishing a barrier to the further progress of the acid.

Prof. Cassidy, see *Dental Chemistry and Materia Medica*, says: "The acid attacks the earthy portion forming insoluble calcium sulphate (Ca So_4), at the same time dehydrating the animal or gelatinous portion, which is mainly made up of carbon, hydrogen and oxygen. These two latter elements are withdrawn as already alluded to, leaving the indestructible carbon as a residue to be incorporated with the insoluble sulphate, producing thus, a protecting covering to the unaffected parts beneath, against further inroads of the causing agents."

This protecting covering of carbon and calcium carbonate are re-

moved or scraped away by each excursion of the rough broach, permitting the acid to take another bite at the dentin.

The same chemical and mechanical action is repeated so long as the broach is kept in motion in the presence of the acid solution.

The depth to which the acid affects the dentin is, unfortunately, immeasurably small.

It would be a great advantage to the work in hand if the acid would or could be made to penetrate further into the dentin. The reason why

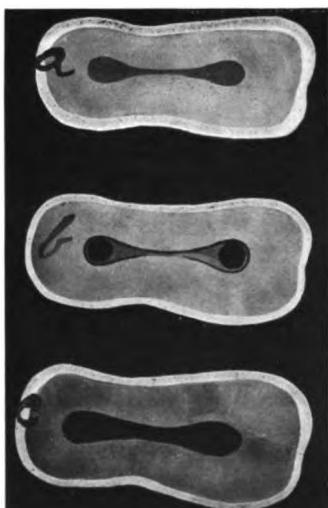


Fig. 6.

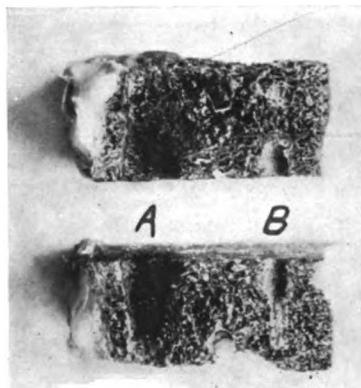


Fig. 7.

Fig. 6. Transverse sections of large flat root. *A*. Canal filled with disorganized pulp tissue. *B*. Attempt to clean canal with drills and broaches often digs a passageway through the disorganized canal contents. *C*. By chemical methods every vestige of organic tissue may be removed.

Fig. 7. *B*. Self-limiting action of sulfuric acid solution on cancellous bone tissue. *A*. Action of sodium potassium on same bone.

a larger area of the dentin is not at once affected has already been mentioned. It may be well to recall, however, that dentin consists of an organic matrix, a reticular tissue of fine fibrils richly impregnated with salts of calcium. Traversing the matrix are long, fine canals or tubes, the dentinal tubules, twenty-five to thirty thousand to the square millimeter. Immediately surrounding the tubules the matrix is especially dense, forming a lining or sheath to the tubes, known as the dentinal sheaths or Neuman's sheaths. Neuman's sheaths are insoluble in boiling sulfuric acid.

**Method of
Applying Acid
in Canals.**

Sulfuric acid causes delicate steel instruments to become brittle and to break on small provocation, leaving small pieces of steel buried within the canal. This unpleasant accident is, as a rule, due to the manner of manipulating the broach.

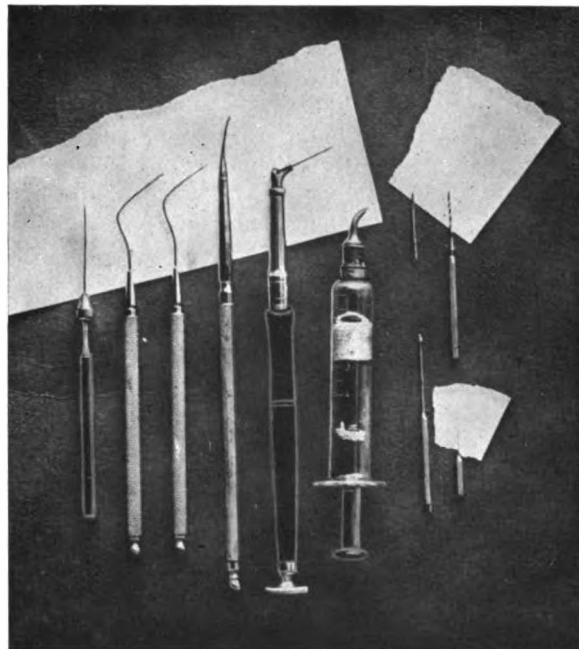


Fig. 8.

Fig. 8. Instruments used for the opening of root canals.

For very fine canals the barbs should be partially or wholly removed from the broach or a fine broach can be made from gauge twenty to twenty-five piano wire. These broaches should be cut to proper lengths and placed in a rigid holder or handle that will hold the broach in a direct line with the line of force. Either pressure or traction may be applied to the delicate steel point. For the heavier work, digging or enlarging should be done with larger and stronger points, made of roughened steel. A better and safer instrument may be made by taking the largest tantalum silicate plugger points, No. 104 or 5 S. S. W., bend to straight line, remove from the handle, file or grind to proper shape, and place in the strong right-angle broach holder made of ivory. This makes a most effective root canal excavator.

The metal is not acted upon or altered in any way by acids. This manner of enlarging or excavating the canal to a large extent at least eliminates the probability of making a false tract or pocket within the canal, and does away with the necessity of using a drill, at least, until the canal is large enough to make drilling a safe procedure.

The point that I am trying to develop is that I believe that the best results are to be obtained by eliminating the undesirable or dangerous, and taking advantage of the safer and desirable features and results, that may be obtained through the use or application of every chemical agent or instrument that will meet the exigencies of the case in hand.

In straight and sufficiently open canals or in canals that have been enlarged by chemical means to a sufficient size to pilot the root drill, for the sake of speed, for convenience in shaping of canal, a Kerr drill, or a Gates-Glidden, from which the point has been ground, or bud drill, may be used.

If the finer canals contain fairly well organized pulp tissue that the broach fails to engage, sodium-potassium should be applied. After the pulp or other organic tissue has been converted into a soapy substance, the removal of this soap from the canal becomes a necessity; some of it may be removed with a stream of water; only a small proportion, however. Swabbing with cotton on a broach does but little better. If the root canals of an extracted tooth be opened and thoroughly treated with sodium-potassium, the canals then washed out with water as would be done if the tooth were in the mouth, and if you then dry the tooth and crack open the roots, in the apical third of the root canal a dark, rather dense, soapy mass will be found packed within the fine canal. If the tooth fragments be kept dry for a day or so the dentin will show a greenish yellow color—not a very pronounced discoloration, but sufficient to show the presence of a coloring matter. All of this soapy mass will be thoroughly removed from the canal, if sulfuric acid be pumped into the canal in sufficient quantities to overcome the alkali, and having been worked to the end of the canal with broach, then the root canal be flooded with a saturated solution of soda bicarbonate. The reaction will at once remove practically all foreign substance from the canal. If the tooth then be dried and the roots cracked open the canals show white and clean as marble.

With the tantalum root excavator and sulfuric acid the root canal may be enlarged more rapidly and with greater freedom from unpleasant and sometimes dangerous conditions. The acid destroys and breaks down disorganized organic tissue, the soda solution removing the débris without forcing the disorganized substance through an open foramen, as many dentists seem to fear.

If acid solution be placed in a small glass tube, and you then pour the soda solution into the tube, it will be seen that chemical action is all on top of the acid, or only on the surface of acid exposed to the soda; or, in other words, it does not react in the form of an explosion, the larger end of the canal being open and offering no resistance to the gas. If the acid solution should pass through the foramen no further reaction could take place than that of irritation, as will be shown on the screen.

Rosin Solution in Root Canals.

By Dr. J. R. CALLAHAN, Cincinnati, Ohio.

Read before the Kings County Dental Society, Brooklyn, March, 1915.

Colophony, resin, commonly known as rosin, is obtained from turpentine by distillation. In the process, the oil of turpentine comes over and the rosin remains behind. Rosin varies in color from dark red-brown to black and white, according to its purity, and the degree of heat used in its preparation. Chemically, it is the anhydrid of abietic acid. It has the physical and chemical properties common to all resins. It softens at 176 degrees F. and fuses completely at 275 degrees F., is insoluble in water; with difficulty is soluble in alcohol; freely soluble in chloroform, acetone, benzene, and fatty oils.

The rosin that is best adapted to dental uses that I have been able to find is that prepared by Bernardel for the use of the violinist. It is a French preparation, very near the color of dentin. The formula, as given below, makes a very thin solution. It required a long time for me to realize the advantage in the use of a thin solution. A thick mixture will not penetrate the tubules, nor does it give up enough chloroform to dissolve the gutta-percha:

R	Rosin	gr. xii
	Chloroform	3ij
m	Fiat sol.	

As we are to deal with dentin that has been subjected to infection, a brief rehearsal of the histological anatomy of dentin will aid us in getting our mental eyes in the same focus.

Arthur Hopewell Smith, in his late book, "*An Introduction to Dental Anatomy and Physiology*," says:

"The functions of dentin are to give substance to the tooth itself; to provide a centre of sensation; to protect the pulp. Enamel is without



the pale of nutrition. The pulp is highly vitalized and the dentin is on the borderline of the living and the dead: semi-vitalized, if one may so speak.

"Nature would not for a moment tolerate the presence in the midst of living tissues of a dead body like enamel. The result is therefore the presence between the living pulp and the inert enamel, of a large area, relatively speaking, of a tissue which is marvelous and unique. In no



Fig. 1. Water dropped into a dry glass tube does not go to the end of the tube on account of entrapped air. Rosin solution should be worked to the ends of root canals with fine broach.

other part of the body do we find an entirely tubular structure like dentin. Its peripheral parts where it joins the inorganic enamel and cementum are less vitalized than its central parts. This explains the reason why the dentinal tubules are not of the same caliber throughout their lengths. They vary from 1.7 m. to 5 m. The diameter of the tube diminishes as it proceeds outward, until at the peripheral region of the tooth it becomes immeasurable. The dentin of the crown of teeth is more plentifully supplied with living material (protoplasm) than the roots; hence the tubes branch more frequently in the latter than in the former situation. The tubes carry the dentinal fibrils; that is, the peripheral poles of the odontoblasts."

It is through these dentinal fibrils that nervous stimuli are transmitted to the pulp. Following the teachings of Miller and Black in the study of carious dentin, we note among other interesting things that caries progress along the lines of the dentinal tubuli; that the form of the disintegrated dentin is that of a cone with the apex toward the pulp chamber, and that the dentin is decalcified in advance of the penetration of the micro-organisms.



Fig. 2.



Fig. 3.



Fig. 4.

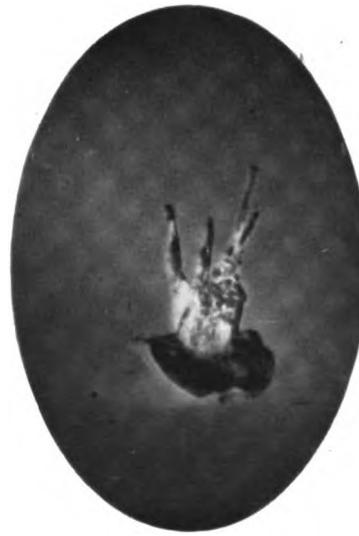


Fig. 5.

Fig. 2. Shows what happens when long gutta-percha canal point is forced into canal without the pumping motion.

Figs. 3 and 4. Tooth substance having been dissolved away from root canal filling. Shows the long minute canals that the rosin and gutta-percha solution enters and seals.

Fig. 5. Palatine root of upper molar enlarged with drill, making a false pocket. The rosin-gutta-percha solution not only filled the false pocket, but entered the true canal and filled it to the end.

It is not likely that in the preparation of cavities we always remove the apex of the affected dentin. In deep-seated cavities is this advisable? In spite of the application of strong antiseptic agents, recurrent decay may develop and toxins finally reach the pulp.

**Advantages
of Rosin.**

If the remaining traces of thin layers of decayed dentin can be thoroughly dehydrated, the application of rosin solution may be of great service.

First, rosin being more or less a non-conductor,



Fig. 6. The shaded area about the root canal filling shows the distance that the rosin has penetrated the dentinal tubuli in this tooth root.

it reduces the shock of thermal changes, thereby lessening the tendency to secondary growths or deposits within the pulp chamber that are so noticeable under large metallic fillings, especially under large gold inlays.

We are taught that the decalcified dentin that is to be found just in advance of the micro-organisms in carious dentin furnishes food for the invading germs. If the remaining decalcified dentin be saturated with rosin, I imagine the cost of living in that region will become prohibitive. However, if the rosin solution reaches the farthest boundaries of the decalcified dentin through the infected area, then the micro-organisms within the tubuli will have been engulfed within the rosin solution, and unless the bacteria are able to liquify the rosin, they will be forever inhibited from further activity, be they aerobic or anaerobic, in active or spore form. I need only mention the antiseptic properties of the chloroform.



This, you will admit, would be a very desirable condition in which to have a layer of decayed or decalcified dentin over the pulp, where the removal of the layer of decay would mean the exposure of the pulp.

The most satisfactory results that I have had in capping pulps has been to flow a rosin solution over the exposure, evaporating the chloroform with warm air, then to cause a very thin cement to flow over the floor of the cavity and the thin coat of rosin and allow it to harden, being very careful to avoid pressure of any kind on the cement until quite hard.

This practice has been confined to quite small and recent exposures. Not the least satisfactory use of the rosin solution is after more or less thorough drying of the cavity and application of the rosin prior to the insertion of gutta-percha filling, either as a temporary, or permanent filling.

On the removal of a temporary stopping of this nature, that has been in place a week or a month, the decayed dentin, which for any reason may have been left in the cavity, will be found noticeably tough and hard and dry, due to the presence of the rosin, and the sensibility of the dentin will be materially less, showing that the dentin has been free from the irritating effects of acids, or, in other words, the fibrils have been in a state of comparative rest. And after all is said, the chief function of the surgeon is to remove the irritant and place the affected region at rest, to the end that Nature may perform a cure.

We now come to the consideration of the time-worn subject of root-canal filling. Let us not undertake to discuss the treatment of root canals preparatory to filling further than to say that no root canal is properly prepared for filling unless a fine paper canal dryer, as furnished us by the dealers, can be passed to or near the apical foramen.

If possible, is it desirable or necessary that the tubuli be sealed?

Dr. Hermann Prinz, whom I regard as one of the foremost among our scientific research workers, said in a paper read before the St. Louis Dental Society, September 2, 1912: "If the canal is not filled perfectly, serum will seep into it from the apical tissues. The serum furnishes nutrient material for the micro-organisms present in the tubuli of a primarily infected root canal."

The dentin is traversed by dentinal tubuli, which number from 25,000 to 30,000 to the square millimeter. The pulp in situ sends protoplasmic processes into these tubuli, and is connected with the peripheral tissues by arteries, veins and nerves which pass through the main foramen and a number of small foramina (usually 2-7) present

**Multiple
Foramina.**

in the apex of the tooth. According to Fischer, these accessory foramina are found in about ninety per cent. of all permanent teeth. These anatomic facts are not sufficiently emphasized at present. Their significance is of great importance for the full comprehension of the pathology of secondary infection.

In an incipiently infected root canal, these dentinal tubuli and the small foramina offer ready hiding places for various forms of pathogenic bacteria.

Action of Bacteria. After exhausting the nutrient material, the bacteria become attenuated, or they assume resting forms. If the tubuli and the foramina are tightly sealed, these enclosed bacteria must necessarily remain permanently confined in their lodging places, while if the root canal filling leaks, the seepage of serum furnishes fresh material which offers excellent opportunity for their renewed activities.

By continuity this secondary infection spreads along the lines of least resistance, *i. e.*, toward the apex, and finally reaches the pericementum. This tissue protects itself against the invading foe by a reactive inflammation, which results in the production of a fungus growth known as a granuloma, or in the past, as the abscess sack or pyogenic membrane.

For years the enclosed bacteria may remain dormant. At the slightest provocation, however, overexertion, a cold, increased blood pressure, lowered vitality, or some other cause, they may assume a most virulent activity, resulting in the production of the so-called subacute abscess. Based upon this supposition we are able to furnish a plausible explanation of how these obscure secondary abscesses occur about the devitalized teeth which at one time were pronounced cured.

In one of the most profound papers given to the dental profession on mouth infection; Dr. Rhein says: "Unfortunately, as a profession we must admit that most of the cases of blind abscess are the results of imperfect dental operations. In some cases they may be the result of bad judgment on part of the operator; in others they may be due to ignorance and incompetence, but a very large number of cases are attributable to the failure of the educated dentist to give the time needed to perform an aseptic operation and have the field absolutely free from the possibility of future infection. This is absolutely nothing short of malpractice when done by a dentist who knows."

We have the testimony of several investigators to the effect that it is possible to sterilize the root canal proper, but it is an impossibility to sterilize the infected dentin of a tooth while it remains in the mouth.

The microscope and the culture media have shown us conclusively that we have been, and are now, leaving enormous numbers of micro-

organisms within the body with a more or less available route open to the circulatory system where they may reach any part of the body, carrying destruction to those organs or parts that may offer the most attractive lodging place.

A most significant fact must be borne in mind in regard to the devitalized dentin. We have no blood current to assist in the struggle. The dentin has absolutely no power even to assist in repair. No granulation nor scar tissue—nothing but an inert tubular mass infected by millions of toxin-producing micro-organisms. We must make of this infected tubular mass an inert, harmless and stable body, including the effective closing of the numerous foramina, to the end that Nature may be able to develop the root mass in a healthy and vigorous periodontal membrane that the tooth may serve its several useful purposes for a number of years.

Most of us have at one time or another shared in the opinion that what the root canal might be filled with mattered but little.

Requirements of Root Canal Filling. The radiograph in the hands of the advanced dental practitioner has brought to light evidence sufficient to prove the fallacy of such an opinion. It does matter as to the material; it does matter as to the manner of placing the material in the canal. The matter of prime importance is the sealing of the more or less numerous foramina, and, as we have no assurance that all the foramina in a given root canal are located near the apex, it becomes our duty to seal the whole length of each canal with a material that will search out and seal minute canals or openings which, owing to physical conditions, we are unable to see.

Gutta-Percha Root Fillings. Have we a root canal filling material that will meet the requirements indicated above? We have three that may be considered. Gutta-percha and chloro-percha in combination; paraffin, as advocated by Dr. Hermann Prinz and Dr. Dunning, and the combination of rosin and gutta-percha. With the gutta-percha cone and chloro-percha you are quite familiar. We know of many successes as well as of many unhappy failures with this root filling, sometimes due to faulty manipulation, but often due to the fact that the root canal filling has shrunken sufficiently to admit body fluids to the canal, or permit egress of the micro-organisms that infested the tubuli, and in addition the gutta-percha root fillings are often found to be saturated with decomposed and odoriferous substances that we are altogether too familiar with.

**Paraffin
Root Fillings.**

The paraffin root canal filling, as advocated by Dr. Prinz and Dr. Dunning, has many attractive features, and time may prove it a most, if not the most, acceptable root filling. I have not always succeeded in getting the paraffin to the apex of the roots of upper teeth. If the wire is too hot the paraffin will collect about the shank of the instrument, and if not hot enough it does not flow to all parts of the canal. The melted paraffin will, however, follow the paraffin oil into the tubuli and foramina if treated properly. It will take time to prove its permanence within the body. Our previous experiences and the experiences of the surgeon have made us a little shy on this point.

**Rosin and
Gutta-Percha
Root Fillings.**

The technic of the rosin-gutta-percha root filling is simple, easy, quick, and sure to seal all tubuli and foramina *that are open*. Before proceeding with the filling of the root canal, all instruments, cotton-paper points, gutta-percha points, should be placed in the steam chest, superheated steam being the most effective sterilizing agent. After steaming the proper length of time, the steam is shut off from the chest. This soon dries the instruments and points and cotton broaches. The gutta-percha and paper points after cooling in the basket have lost none of their desirable properties.

I have said that a root canal should be of the general shape of the fine paper root canal driers as furnished us by the dealers. In addition to this general form, have the mouth of each canal a decided saucer shape. This will facilitate the placing of agents or instruments to or near the apical foramen.

**Drying
Canal.**

The first step, then, is the complete dehydration of the dentin, using acetone, as advised by Dr. Prinz, as the dehydrating agent. After flooding the canal with acetone, use the paper points liberally until the canal is entirely free of moisture. Follow this with warm air. Then hold a warm wire in the canal for a minute or two, being careful that the wire is not hot enough to scar any part of the canal.

Right here is where many root-canal operations fail. The canals and tubuli must be as dry as it is possible to make them, bearing in mind that it is possible to do damage by overheating the root.

**Introducing
Rosin.**

Now flood the dry root canal with the thin rosin solution, pumping it in with a wisp of cotton on a broach. When the canal is full of the solution, pass a fine wire or broach to the end of the canal. Work out all of the air that may be trapped therein. This is of vital importance.



After the canal has been flooded or pumped full of the rosin solution, dip the cotton and broach that is being used into or pick up on the cotton, bismuth oxide hydrate. Work this into the rosin that is already in the canal. This is not essential to the preservation of the filling, but makes a more distinct picture of the finer canal fillings when the X-ray is in use.

**Inserting
Gutta-Percha
Cone.**

The canal point should be made of base plate gutta-percha. It should carry no drugs nor any additional element that will have a tendency to weaken or reduce the strength or rigidity of the cone, because we wish the gutta-percha to dissolve rather slowly at the periphery, while the attenuated centre retains rigidity sufficiently to permit of being pushed along.

Select a gutta-percha cone that will reach to or near the end of the canal, holding the cone with a fine foil carrier, and pass the cone carefully and surely about *half-way* into the canal, pumping the cone up and down in the canal, usually from forty to sixty times, and, as it dissolves in the chloroform, advancing the cone farther toward the apex.

The pumping motion forces the rosin solution farther into every opening. The chloroform at the same time dissolves the periphery of the gutta-percha cone, which, becoming more and more attenuated, slips farther toward the apex, surrounding itself with a mixture of gutta-percha and rosin. The rosin seals the tubuli and at the same time causes the gutta-percha to stick tight to the canal walls and makes the gutta-percha more stable and proof against the action of body fluids or substances.

If this does not leave the large end of the gutta-percha cone at or near the end of the canal, place a small cone alongside or on the first one, then, with cold steel plugger points that will go into the canals, gently pack the mass into the canal, using warm air to soften the protruding gutta-percha if necessary.

This packing forces the semi-fluid (chloro-percha and rosin) into the unknown canals and pockets, and at the same time brings the surplus chloro-percha to the mouth of the canal, where it may be taken up with absorbent rolls or cotton.

In multi-rooted teeth complete the filling of each individual canal before starting another.

Rub the steel plugger points on paraffin cake to prevent the partially dissolved gutta-percha from adhering to the instrument. The pulp chamber is to be filled with one of the cements.



**Queries
Answered.**

You may ask: "Do you succeed in filling all canals and tubuli to the farthest extremity?" No; only those that are open and dry to the farthest extremity.

Are we likely to have inflammation in the periapical region following the closure of root canals in this manner?

The probability of inflammatory conditions in all cases depends upon the ability of the operator to read the pathological signs of each individual case and his skill and delicacy of touch in the manipulation of the various agents used.

Rosin and chloro-percha and gutta-percha cone is superior to chloro-percha in three ways. First, the rosin in chloroform penetrates deeply into the tubuli and foramina, into which *chloro-percha will not enter at all*, leaving within such tubuli or foramina, upon the disappearance of the chloroform, a more or less solid, inert, insoluble substance that enmeshes the contents and seals the lumen of such tubuli or foramina. Second, the rosin and chloroform causes the gutta-percha, in whatever form it may be applied, to adhere closely to the walls of root canal or cavity. Third, the incorporation of the rosin in the freshly made chloro-percha makes an unshrinkable and impervious mass about the gutta-percha cone. If gutta-percha and rosin be dissolved in chloroform and left in an open dish or tube to dry or solidify, the rosin will rise to the surface and harden in a crust over the gutta-percha. When the mixture is made in the root canal, as has been suggested, the rosin in solution is held firmly in place in the dissolved gutta-percha between the canal wall and the cone in the centre.

We must be prepared to meet all sorts of morbid anatomical changes in the pulp chambers, root canals and the dentinal tubuli, due largely to constructive irritations long present in and about the tooth.

The slides that I shall show on the screens are selected, each one, to assist in demonstrating that the teeth which require root canal treatment are, as a rule, far from being the perfect anatomical specimens that we see illustrated in our text-books. A tooth that has lost its pulp has usually been subjected for a long time to those conditions that bring about destructive as well as constructive changes.

The rosin solution does not show in X-ray pictures until mixed with gutta-percha, when it shows very plainly in the canals and foramina, but not in the tubuli. Chloro-percha will not enter the tubules; bismuth oxide does not dissolve in chloroform, and therefore does not enter the tubuli; the blue stain spoken of enters the tubuli with the chloroform and rosin solution, but does not show in X-ray pictures; so, in order that we might have some visible evidence of the diffusibility of the rosin solution



through the dentin, I have resorted to color photography. To vouch for the correctness of the pictures I have the original specimens here for comparison. One better versed than I in laboratory technic could certainly work out a more satisfactory scheme than this.

The pulp canals of a number of extracted teeth were opened mechanically—that is, with burs and drills—dehydrated and pumped full of the rosin and chloroform that had been stained blue. Then the gutta-percha cones were used as has been described above.

I do not claim that this procedure gives an exact reproduction of conditions in a tooth canal while the tooth is yet in service in the mouth. I do claim that the specimens and the pictures give a clear and understandable basis from which we can work toward a reasonable ideal.

These slides are shown more to explain the theory than to prove results. There is a vast difference between filling a root canal in an extracted tooth and one in situ.





Wisdom Teeth.

By JOHN D. THOMAS, D.D.S., Philadelphia, Pa.

I have, from time to time, in the goodly number of years of my experience as an extracting specialist, or as an exodontist, as our friend, Dr. Winter, of St. Louis, is pleased to make the term, written several articles bearing upon this subject, which have been read before numerous societies, and I find in looking over the archives that in 1886 I wrote a paper for the *Dental Practitioner* and read it before the Odontological Society of Philadelphia in January of that year, in which the conditions and difficulties were described, and I can find little to add except to change and modify the conclusions and recommendations of that day.

The conditions of suffering from the diversion and perversion of these teeth in their efforts to erupt are the same to-day, only more so. In those days it was the practice to extract, for "regulation," one of the bicuspids on each side, and in some instances

it was recommended that the temporary molars should be extracted, so as to enter the process and remove the bicuspids which were not as yet wholly formed to forestall the possibility of irregularity. It was also what might be termed a craze with some of the profession to leave the bicuspids and extract all four of the first permanent molars, sound or unsound, and in many cases if operated upon at the tenth or eleventh year the other teeth would come together and the mouth be beautifully regulated by its own growth and adaptability. But sometimes it would not. It was, however, a notable fact that where these teeth had been extracted it was of rare occurrence that there was any difficulty in the eruption of the wisdom tooth. From that experience I asked the members of the Odontological Society to help impress upon the profession the necessity of giving such consideration to these oral perverts as would relieve our patients of much of the suffering they had to bear.



Since then the whole practice of dentistry has changed. Instead of extracting to correct irregularities, our friends, the orthodontists, have by scientific methods and appliances succeeded in a measure in expanding the jaws to make room for the full complement of teeth, or, rather, the ten front teeth in either jaw. Their efforts seem to cease at the first molar, and there is no thought whatever of the late but persistent incoming of the wisdom tooth. As a result, the extracting specialist, or exodontist, has more third molars to extract as an individual tooth than any other in the mouth. As a record, the writer had in one morning seventeen such operations in succession. This would seem to indicate that, in our present status, these teeth are superfluous.

Originally, of course, an all-wise Providence intended the jaws of the whole animal kingdom to become sufficiently developed to give ample room for all the teeth designated as necessary for the proper mastication of the food required for the sustenance of each, and I am not cognizant of any instance in the lower animals where contraction of the jaws has been such, that teeth in their natural eruption have given trouble from lack of room in their development. But this occurs with the human species, whether from amalgamation of the races (speaking of our own people) or the too strenuous efforts of education and refinement to produce a class of thoroughbreds and promulgate the very best that can be produced in human life, or whether it is a sign of degeneration is a subject not under discussion here; but the fact remains that a vast number of the clientele of the dental profession exhibit this condition of lack of room in the human jaw for the full development and eruption in their proper places of all the teeth originally intended, and the wisdom tooth is "the goat," and a mighty vicious goat he is in many instances.

It is not the intention in the present paper to discuss the causes of the malposed, diverted and perverted conditions which these teeth exhibit, but to speak of them as they exist and to tell how to handle them, and I wish to be understood as discussing the lower jaw. Wisdom teeth in the upper jaw give comparatively little trouble in extracting, though in a few instances I have met just as much severity in the operation as in the lower, but the greater elasticity of the bone composing the tuberosity render them easier of manipulation, and consequently there is less injury from trauma. It is the condition of the lower third molar that I am referring to here.

Removal of Lower Wisdom Teeth.

There was a time in my career when if the extraction of one of these teeth was considered essential, it was expected by the dentist that it should be done, and it generally was done; but, oh Lord! what havoc was perpetrated! What suffering engendered!

Their position at the angle of the jaw is where the surrounding soft tissues are most susceptible to the influences of inflammation, and as no one can be sure of controlling this inflammation, or the extent to which it may go, it would sometimes involve tissues and glands in the throat and neck, as also the cheek. In addition to this, the amount of physical force necessarily applied would cause inflammation of the bone, and being in close proximity to the inferior dental nerve, all combined made the post-operative pain more than any patient should be called upon to bear.

To the mind of the ordinary citizen in any community, the extraction of a tooth is considered but a small operation, painful, of course, for the moment, but he expects relief from toothache at once, and that is to end the incident; but to have to endure such a post-operative ordeal as was here witnessed was unlooked for, and to their minds uncalled for. In many instances it was necessary to visit patients at their homes, for after treatment, or they would call in their family physician. As the extraction was blamed for it all, they would expect the dentist to pay the physician's fee, and probably to pay the patient for loss of time from his occupation, and four or five times in my life I have been threatened with suits at law for damages. Under these circumstances it became necessary to modify somewhat the line of procedure. I have grown to be merciful and give the patient first consideration. Any operation which is bound from trauma to cause more suffering than relief, the consequences of which are so serious, in many cases should be avoided until we can see whether delay will not develop more favorable opportunities for final results.

I classify these oral perverts under four heads.

**Classification of
Crowded Wisdom
Teeth.**

They vary, of course, in degree, and each variation if described in full detail could furnish material for a separate article. But I think for the purposes of this paper each class will be readily recognized by the description here given. But I wish to impress on the reader as forcibly as I can that the cause of ninety-nine per cent. of all the cases which are responsible for all this trouble is lack of space.

Class 1. Those which in their development and eruptive effort from lack of room are forced out of alignment

Their crowns may point, following the line of least resistance, either directly toward the tongue or reversely toward the cheek. During their progress, inflammation of the soft surrounding tissues will ensue; this may be relieved by free lancing and blood letting. As the tooth is free from stricture in its accepted direction, it is only a "waiting

policy" to delay until the crown has progressed sufficiently to secure a good hold by the forceps. Their roots are seldom crooked or divergent, and extraction is not a difficult operation. It may be that lancing may have to be repeated before they arrive at the extracting stage, but they exhibit nothing serious either in the operation or aftermath.

These cause greater difficulty. They will come

Class 2. forth in perfect alignment with the anterior teeth, but for want of space will be pushed so far in the rear that they become locked in by the second molar and the ramus. Sometimes quite half or more of the cusps will be under the bone, and further progress in eruption is impossible. Here is where we get the crooked and diverted roots which make these teeth anomalies and so difficult to extract. From the earliest formation of the tooth the crown is caught as above described, and in the development of the roots from the crown to apex the roots must follow the line of least resistance in the cellular structure of the bone. Their extraction is most difficult, and the post-operative effects are also most severe. I have in a few instances cut away the bone with a surgical bur to give room for their removal, but from the malformation of the roots in most cases the operation has not been satisfactory. We must bear in mind that they are buried in solid bone and hard bone, too. There is the second molar in front, broad, solid bone on the buccal side and the ramus behind, and the place of least resistance is usually the lingual side, toward which the force must be applied. If the roots should be straight or combined and curved the injury will not be so great, but they are seldom so. In directing force toward the tongue we run the risk of breaking a bit of the bone of the inner plate; we also run the risk of injury by friction to the second molar, so that its loss may be looked for in the not very far distant future. So in view of all that I have witnessed in the pain caused by the persistent effort of the tooth to erupt in its proper position; the suffering subsequent to the operation; the risks we run from the close proximity of the tooth to the inferior dental nerve, which by reflex may involve all the nerves of the eye, ear, nose and throat; and recognizing that the condition is brought about from lack of room, as the easiest way out for all concerned I recommend the removal of the second molar, allowing the wisdom to take care of itself.

These are the slanting ones, and are trying to

Class 3. the soul of the exodontist as well as to the feelings of the patient. The difficulties of their extraction increase with the variations of their position. They do not excite as much inflammation of the soft tissues in the preliminaries of the eruptive

efforts, as some others, but if they do, free blood letting will afford relief until their position is permanently secured. Their roots are mostly straight or combined and curved, and if the crown is not too low down, by directing the force toward the lingual plate the bone will distend. So by turning it in its socket from under the crown of the second molar it may be removed without any great strain or injury to the roots. But the anterior cusps are often found pressing against the posterior root of the second molar anywhere from below the enamel of the second molar to half-way down to the apex, so that their removal in many cases is next to impossible and in some cases absolutely so, without taking the second molar also. In such condition, instead of taking both, it is better to remove the second molar and leave the wisdom tooth; even in its slanting position it is better than no tooth at all, and we have relieved the pain by supplying room. All this applies, of course, to cases where both the wisdom and second molar are perfectly sound.

Not always from carelessness on the part of the patient, but from absolute inability to preserve perfect cleanliness at the point of juncture between the crown of the wisdom tooth and the posterior portion of the second molar, we may find a cavity at that point in the second molar, unsuspected by either the patient or dentist, until it has penetrated the pulp canal of the second molar. To my mind, it would be utterly futile to devitalize the pulp through the crown or otherwise attempt to fill such a cavity; hence the extraction of the second molar becomes imperative in these cases.

In the cases where these slanting teeth present with decay and pulp exposure we have added troubles. The second molar is sound, and it is not only desirable, but very essential, that it should be preserved. Although the removal of the second molar renders any case of slanting third molar an easy and simple extraction, where to conserve and retain the second molar is an object most to be desired, it is my practice to crush the crown of the third molar and to remove the portion pressing against the second molar. Then if the undecayed portion of the tooth is above the bone sufficiently to get hold without too much effort, the balance can be removed. But we frequently find the cavity below the edge of the bone, in which case I crush and remove as much as possible, remove the pulp, and leave the balance for a future operation. It may be six months, or a year, or longer, but the root is bound to rise to the surface, and at a future time its extraction will be an easy matter. In order to accomplish this and to make the crushing of the crown less difficult, I have with a bur or drill sometimes made several punctures in the crown.

Unquestionably it would be appreciated by the patient to know the



tooth was extracted completely at the first operation, but will he patiently endure the post-operative suffering incurred? It is not so much the question of getting the whole tooth out as it is of the patient submitting to the consequences.

These are peculiar. They form in the body of
Class 4. the bone, never come to the surface, and from any indication exhibited in the mouth will give no evidence of their presence; but they are there. In extracting the second molar from any cause, I will not say I have met a dozen, or a score, but hundreds of them, and I have no doubt if the X-ray could be applied in all cases we could find thousands of them. Having made their position in the bone and become fully developed they lie there quiet and serene, and compared with their great number a very small percentage of them are the cause of trouble and their existence may never become known. When they do make their presence felt, they assist themselves nobly, and this is exhibited by intense neuralgia of all branches of the fifth nerves and by reflexes which will involve at times all the nerves of the eye, ear, nose and throat. There are just two ways by which this great suffering is brought about. One, by the contact of the wisdom tooth crown against the posterior root of the second molar. Resorption of the dentin in the second molar will occur until it penetrates to the pulp canal of that tooth. Second, the reverse action. By the same process the roots press against or even penetrate the roof of the inferior dental canal and impinge upon the dental nerve. Neuralgia and all its concomitants will be the result. These cases are sometimes difficult of diagnosis, but by the radiograph they are readily discovered. Of course, removal of the second molar is the first proposition in either case, and in ninety-nine cases out of a hundred relief is complete. The others do not come within the realm of the extracting specialist, but are legitimate subjects for a major operation by the oral surgeon.

I think I have said enough to demonstrate that the varying degrees of perversion in the growth and eruption of these teeth is due to lack of space in the jaw. I have been criticized in a few instances for recommending the extraction of the second molar, but when we recognize the post-operative suffering and the injury to the bone and possibly to the inferior dental nerve, which may result, the risk is too great; so all things considered my many years of experience convince me that I am right.

**Orthodontists
Responsible for
Impacted Teeth.**

The number of these impacted teeth, particularly those described in Class 2, has mostly increased in the last few years, and I cannot avoid the feeling that orthodontia is in a measure responsible for a good deal of the difficulty. The orthodontist has

demonstrated the possibility of expanding the jaw to the extent of placing the ten front in their proper position, but their efforts, as remarked before, cease at the point of the first molar, and they have given no consideration of what is to come after that. It is an established fact that where a tooth, any tooth, has been extracted, the incoming wisdom tooth has a far easier time on that side.

**First
Molars.**

Now, just a word about the first molars. It is a well-known fact that from systemic cause these teeth are erupted with defective structure, and caries soon appear. In very many of them, filling will not effectually arrest the decay and the process is familiar to us all. Increased decay, which we treat by amalgam or cements, in the hope that the tooth as the child grows older will improve in density of structure. "But if pulp exposure appears," Dr. Darby says, "before the eleventh year, it is better to extract." I go further than that and assert that any first molar, the pulp of which must be devitalized before the fourteenth year, should better be extracted, because it cannot be treated with any degree of certainty of permanency. It is more than likely to progress in its disintegration, requiring a large amalgam filling and then a gold cap, and final extraction, at some time after full maturity of the patient. In the meantime the wisdom tooth has had its fling with all its triumphs in causing trouble, and this tooth is most likely to be a perfect and beautiful one, which in its rightful position would have been a useful member for life. Yet it is sacrificed because of the retention of a defective first molar, and when the final extraction of the first molar does occur, the second molar is left like the last rose of summer, all by itself, and the posterior part of the mouth is practically ruined for masticating purposes. If the first molar had been extracted at ten, twelve, or even fourteen years of age, space would have been given for the proper eruption and alignment of the wisdom tooth. Heaven forbid that we should go back to the days of '86 and extract all first molars, sound or unsound; but I wish the profession would give greater consideration to the conditions caused by these oncoming teeth.

It is the practice of the medical profession to do all they can for the prevention of disease rather than to rely solely on treatment after the disease arrives. Inasmuch as the jaw in many cases does not afford room for the proper placement of all the teeth provided by Nature, it is the province and duty of the dental profession to see that space shall be provided and thereby spare our clientele from the great amount of suffering that is exhibited to-day.

Undoubtedly there are many of these cases which could perhaps be brought in the field of the regular surgeon as major operations under



ether, with corresponding fees, but in all my experience—and it may be admitted in a record of over 292,000 operations that I have met a few of them—I can recall but four cases where the major operation was recommended by me. Three of these were of the type referred to under Class 4. The fourth was of Class 2.

The first two of Class 4 resulted satisfactorily, but the third case destroyed the roof of the dental canal, and in the process of healing and such reforming of the bone as was possible the solidification of the bone impinged upon the nerve to such an extent that a severe case of tic doloureux resulted. There was first trephining of the bone back of the foramen and a resection of half an inch of the nerve, which gave relief for a time, but as a finality the gasserian ganglion was removed.

The fourth case was of Class 2, in which repeated attacks of inflammation had brought on indications of necrosis. The man was fifty years of age with a perfect row of teeth up to this point, and the extraction of the second molar would have proved of no avail.





Second District Dental Society. March Meeting.

A regular meeting of the Second District Dental Society of the State of New York was held on Monday evening, March 8, 1915, at the Kings County Medical Library, No. 1313 Bedford Avenue, Brooklyn, N. Y.

The President, Dr. Stevenson, occupied the chair, and called the meeting to order.

The Secretary read the minutes of the last meeting, which were approved.

Dr. J. R. Callahan, of Cincinnati, read the paper of the evening, entitled "Root Canal Preparation." The paper was illustrated by lantern slides.

Discussion on Dr. Callahan's Paper.

**Dr. Herman Prinz,
Philadelphia.** We all know that the work Dr. Callahan has shown is not something new, or something that he is trying to force upon us as some recent discovery, but something he tried twenty odd years ago, and which in the meantime has stood the test of time. It is a very good method, and one which, though perhaps not in all cases, has aided very materially indeed in the cleansing of root canals. If I were to discuss all the phases he has touched upon, the night would not be long enough, so I shall limit myself to the chemical side, perhaps because it is more familiar to me.

Let me say a few words in regard to tantalum.

Tantalum. It is a new metal which has been recently introduced and which has proved a most excellent substitute for platinum. It melts at 5,000°, and a number of dental instruments, among them various types of broaches, are made from it; also appliances

for regulating the teeth, as it stands very well in the mouth, and is destined to take an important part in dental instrumentation.

Potassium and Sodium. The Doctor has referred to the potassium and sodium alkali. Potassium and sodium alkali in the sense it is employed in this particular procedure, does not exist. It is an alloy, and is the same kind of alloy as you use in your office for filling teeth. The two metals form a specific alloy, and when this alloy comes in contact with the material in pulp canals, immediate decomposition takes place, and the results as you have seen will occur.

The potassium and sodium metals commercially are preserved in coal oil, and when we place a small quantity in contact with water, at once a process of hydration occurs, and caustics are formed that will produce a powerful action, destroying organic tissue and to some extent inorganic tissue.

It is in reality a reverse of the process where we decalcify a tooth, leaving the matrix in position. Here we remove the organic matrix, and as a consequence the bony part or the lime salts fall apart, being either washed away or destroyed.

Caustics. The Doctor has gone into a discussion of caustics. He has referred to the various acids and also to the action of arsenic, speaking at various times of the "caustic" effect of arsenic. In the real sense of the word, arsenic does not belong under that heading. It is what we call a protoplasm poison, but it does not destroy protoplasm as a caustic does.

If we take five drops of sulfuric acid and place it upon organized tissue, or take it in the mouth, the result will be that this caustic destroys the tissue. When we take these five drops of sulfuric acid and place them in a glass of water and drink it, there will be no reaction. We simply have a pleasant acid drink and will be happy and contented with it. With a protoplasm poison, the results are different. Take arsenic as an example, because it is familiar to us. Whether you take it as five grains of arsenic plain, or you take it in the glass of water, you will die either way.

Another important factor is this: arsenic will never act upon dead tissue. A protoplasm poison never does. Take a piece of flesh and put on it a quantity of arsenious acid and it will remain forever. That is why taxidermists use it for preserving the skin of animals, but if it is placed on living tissue it will kill the tissue.

Use sodium hydrate or potassium hydrate instead, and that piece of flesh or bone will be destroyed if the employed material is sufficiently

strong. There is no difference between living tissue and dead tissue where the action of a caustic is concerned.

Root Canal Treatment Using Acids. Let me say a few words upon the various phases of root canal treatment by means of the acids. The Doctor has referred primarily to sulfuric acid, and the dental profession as a whole is deeply indebted to Dr. Callahan for introducing this to the profession, because it is a distinct epoch-making step.

Many years after Dr. Callahan had introduced this method of opening root canals, some one suggested that instead of using the 50 per cent. sulfuric acid—equal parts of acid and water mixed—it would be preferable to use a mixture of liquid carbolic acid and sulfuric acid, thereby creating the so-called phenol-sulfuric acid, and kill two birds with one stone. On one hand was the phenol and on the other the sulfuric acid. Phenol is a very powerful antiseptic and serviceable for root canal treatment, and the sulfuric acid would be very good; and each one being good, why should not the two together be better?

But when the two are mixed, chemical combination takes place, whereby the phenol is completely destroyed and the action of the sulfuric acid is materially reduced; and so phenol-sulfuric acid has no value for this purpose.

Using sulfuric acid, the Doctor has suggested 50 per cent., which is correct for very commendable reasons. If we use a pure sulfuric acid, about 90 per cent., we will have at first no action whatever. If we use pure sulfuric acid and pour it into our hand for a short time and wash it off, aside from a slight sensation there will be no action. Why? Because the acid is so concentrated that its molecules are not free to move and it has no time to exert its effect. If, on the other hand, you separate the molecules with water, we give them a chance to act at once; and if we take 50 per cent. sulfuric acid we have a pronounced effect in a short time. If we would use the pure acid it would take too long to produce the action, and when the action is produced it is entirely too powerful. Therefore, 50 per cent. solution is of more benefit.

He has explained to you the effect on living bone and on dead bone. One peculiar and valuable effect of sulfuric acid which he has mentioned, but which I think he should emphasize, is the self-limiting action.

Hydrochloric Acid in Canals. Hydrochloric acid has also been advocated as a substitute for sulfuric acid. Since hydrochloric acid forms more or less soluble salts with the calcium salts of the tooth, its action is much more pronounced than sulfuric acid, which forms the insoluble "plaster of Paris" with some of the calcium salts, and therewith checks its own action.

A distinctly more effective way for opening root canals is obtained by using nitro-hydrochloric acid, commonly known as aqua negia. It has been introduced for such purposes and has been highly recommended by Boennecken. This acid, a mixture of approximately one part of nitric acid with four parts of hydrochloric acid, produces nitrosyl chloride, a most powerful germicidal agent, which is highly destructive to organic acid. When neutralized with sodium dioxide, hydrogen dioxide and, later, free chlorine gas is produced. Nitro-hydrochloric acid is most destructive to almost all metals. Tantalum metal and steel are not affected by it to any extent. The steel broach, when brought in contact with this acid in concentrated form, is immediately covered by a protecting layer of oxide, which prevents the further action of the acid on the broach. Only minute quantities of this acid are necessary for the purpose in view; its action is very rapid and highly affective, and it deserves to be recommended.

Dr. Callahan has introduced the acid method; he has introduced an epoch-making step in the progress of dentistry, which is worthy of our highest consideration; and when the time shall come when we shall have a Valhalla where we place the names of our great men in dentistry, I think Dr. Callahan is entitled to a place therein.

In the notice of the meeting of one of our **Dr. Frazer.** Brooklyn societies, you may read that Dr. Callahan's name is known wherever dentistry is practised—a very pretty compliment paid to Dr. Callahan; but I want to add to the quality of that and say Dr. Callahan's name is known wherever good dentistry is practised. It was not many years ago when it was exceptional that a dentist could tell you without stammering what method he employed in his root canal work. He could not tell you because he did not know. He treated one tooth in one way and another in another way. Dr. Callahan has given us a method which we have had for many years, and it has proven its worth, and I have a feeling that Dr. Callahan's name and Dr. Buckley's name should be connected. Dr. Callahan has given us a method of root canal preparation, and Dr. Buckley has given us something to put into those canals under certain conditions.

The X-Ray. Dr. Callahan has spoken of the radiograph. We know its value; but, after all, the radiograph tells us only what we may have or may not have done. The radiograph does not show us how to get to this "strategic point," as Dr. Callahan calls it. It is of great help to us, and it would be nice if all of us could have in our offices a radiographic outfit; but I have a feeling that the Roentgen ray is a pretty powerful thing, and unless we can give some of our time to the study of its use, most of us would better leave it alone.

**Asepsis in
Root Canals.**

We all quite agree with Dr. Callahan that the first thing to be established in our treatment of root canals is asepsis, and to establish and maintain that we must use the rubber dam. In conjunction with the use of the rubber dam, I want to speak of the use of Dr. Callahan's copper band. I do not know how many of you have used it, but let me tell you, you cannot do without it—a copper or German silver band. Perhaps you did not get quite the idea Dr. Callahan wished you to get. Imagine a lower sixth-year molar with a cavity on its mesial surface, dipping down to or below the gum. Put on the rubber dam, and it bridges the space between that and the second molar and you have leakage. That is where the copper band is fine. You fit it as Dr. Callahan has described, trimming to the gum line, letting the portion mesial to the molar dip down below the cavity proper, and you have converted your complex cavity into a simple one, and you can use your rubber dam and work in an aseptic field.

Sterile instruments are, of course, necessary. I suppose the cabinets in your offices are clean. I dare say no one will claim his cabinet to be sterile—but it is clean. Burnishers and excavators and such instruments do not have to surgically clean, and our cabinets are good enough places for them, but they are not the place for your root canal instruments. Those, I think, should be cared for in some other place than in your instrument cabinet. They should be put into sterile receptacles and placed, if you like, in your formaldehyde cabinet. I have been doing that for some time. Dr. Ottolengui does better. He places his instruments and his gutta percha points in small glass dishes, in the bottom of which are pads soaked with formaldehyde, and those dishes in turn are placed in his formaldehyde cabinet; so he feels when he picks up an instrument for canal work, or his gutta percha points, that he is using something that is perfectly sterile.

Instrumentation in the successful treatment of pyorrhea is undoubtedly the all-important factor, and I believe instrumentation in root canal work is the all-important factor. We have been inclined to be too hurried, I think, in that. When we make an appointment for the opening of a tooth—the pulp chamber and root canals—we should see to it that there are not going to be three or four other patients calling at that time. We must not be hurried, and we must know that it is only by being careful and patient, as Dr. Callahan says, that we are going to work down to or near that end. There may be one or two men in New York or Brooklyn who go to the ends of all roots, but I think the average dentist cannot do it until the Almighty changes His plans on which teeth are made.

**Dr. M. E. Klein,
New York.**

It has been very enjoyable to listen to the humor that Dr. Callahan has put into this very sombre discussion. In a way, it reminds me of a dance in the death chamber at Ossining before one of the inmates is going to be electrocuted the next morning. But it is pleasant to be able to handle this subject in that way.

Professor Prinz forestalled me in a great deal I wanted to say about the combination that kalium natrium (sodium and potassium) forms, and that it is an alloy. It will be twenty years, I think, this summer since I first saw Dr. Emil Schreier, of Vienna, use this alloy of these two metals. I believe that this method of his, notwithstanding all we have listened to from both Professor Prinz and Professor Callahan, the best and simplest method of not only reaching the end of the root, but of being able to pass through the end of the root.

I would like to go a step farther than Professor Prinz went when he spoke of the action that takes place when sodium and potassium comes in contact with water. It is the intense affinity which this alloy has for water that produces the valuable results we obtain. The affinity which sodium and potassium has for water I have frequently compared to the affinity which the magnet has for a piece of iron. It is so great it will jump an appreciable gap to make this "marriage," as it were, and when it occurs, it occurs with such an intensity that in the majority of cases I do not agree with the clinical results that have been described. I have watched this action closely hundreds of times, and seen this action result in an entire obliteration of both the sodium and potassium, and of a given quantity of the tissue which has this water in it. I will admit that under certain conditions we sometimes get a certain amount of saponifying of the tissue, but on many occasions I have seen a complete absence of this saponified tissue, due to the great intensity of this inter-marriage between this alloy and this substance that has a given quantity of water.

I cannot tell you this as Professor Prinz would—I am not a chemist—but I believe that it is due to the different proportions of water that happen to be present in the tissue that it is acting upon. Its action is most favorable when we can get this entire obliteration of everything—absolutely nothing left.

I have devoted a great deal of energy to the technique of the use of kalium natrium, and like everything else, unless it is used intelligently, it can be the instrument of evil instead of benefit. It is, in the first place, of the greatest importance that it should be used in very small quantities. The quantity should never be large, and that is one of its greatest objections, because it makes the progress toward the end of the root

canal slow; but it is the only safe method of procedure.

**Curved
Root Canals.**

I know nothing about negotiating curves of root canals mentioned by the essayist. I do not believe an appreciable curve can be negotiated with any amount of safety, and I do not think it ought to be attempted.

The last speaker made a remark that the radiograph does not tell us how to do it; but that is exactly what the radiograph does do. I never said that we could reach the end of every root. I have said that where the pulp has been dead, and there has been an infection, and we cannot reach the end of the root, and we cannot go through it, then that tooth must be extracted; but I do say that the percentage of cases in which we cannot reach the end of the root depends upon the means at our command and the ability of the individual to utilize and profit by those means.

The essayist and I agree, and a great many of my friends agree, that the thing to accomplish is to seal the periapical end of the root if we want to leave that tooth in such a condition that re-infection is impossible. In order to accomplish that, it is necessary that we should get a straight line from the point of entrance in that canal to the end of that root, or as nearly as possible a straight line.

**Dr. Henry Gillett,
New York.**

Dr. Callahan sets his results before us so clearly and in such a manner that even if we do not quite agree, we never feel like saying so; but I must say I seldom disagree with him in connection with matters concerning root canal work.

**Value of X-Ray
Machine in the
Dental Office.**

I do have a little different attitude concerning the value of radiography in our work. I have reached the point where, if my X-ray apparatus were taken away from me, and I could not have it in my own office at my command to use immediately whenever I wanted it, I should give up the practice of dentistry. There is, in my estimation, no branch of the healing art in which the possession of an X-ray outfit in the office of the practitioner, under conditions where he may use it at will during the progress of his work, is of as great importance as in the practice of dentistry.

It is not sufficient that it be around the corner, or even in some other office in the same building, to get the same service. I take exception to the point that is repeatedly made at our meetings that it is unduly expensive. It is not, for the results it provides either for the operator or his patient. In fact, it returns such great value to both that I believe no operator who assumes or claims and sets forth to his patient that he is

doing dentistry of a high grade can possibly get along without it. It is an essential part of high-class dental practice to-day.

There is an idea that because the specialist in that work charges \$5, or \$10, or \$15 for each exposure, that the expense is prohibitive. One of our practitioners in New York, who makes an exceedingly great use of it, to be sure, so that his percentages come down somewhat, compared to what would be the case in many other offices, has made a careful estimate of it, including the depreciation of the machine, and he has figured that radiographs in his office cost him 12 cents apiece, including the time he puts on it. Many a radiograph is worth \$50 to the patient. He saves three or four hours of time with the operator prodding and hunting and wondering where he is going to come out, and that sort of dentistry in the end is a loss to the patient.

**Better Canal
Instruments
Needed.**

One of the essential needs at the present moment in this department of our practice is the development of better instruments for the work. With the assistance of radiography and the careful study we have made, more especially in the last two or three years, we have advanced to a stage where our desires are in advance of the possibilities of instrumentation. Our instruments are not up to the man. I hope we may stimulate a broad interest on the part of the manufacturers, either in the following out of these tantalum instruments or in the development of some other alloy or metal instruments, so that it shall not be possible for the president of any organization to say there are only two or three men who are reaching the ends of root canals. We must reach a different status. If that is the average standard of dentistry to-day, we are going to have a lot of trouble within a very few years.

It gave me very great pleasure, and I consider Dr. Callahan, you paid me a very great compliment, when you brought Dr. Prinz here to discuss this subject.

There is not a man for whom I have greater respect, and I am only sorry I do not live in Philadelphia, where I could go over and be in his laboratory and be improved by him and his teachings at all hours of the day.

I agree exactly with all of you in regard to the radiographic instrument. I have been spoiled, because within a few doors of me I have a friend who does that work for me, and I have been so in the habit of running over to him that I have not had to do the work myself; and perhaps that is my reason for not having done it myself.

The placing of the wire in the root canal and photographing it, and all that sort of thing, is perfectly proper, and I do not see how you can get along without it here; but you have experts here in New York along

that line, and I tried to explain in the paper that I passed over the discussion of that because I did not think it was necessary in this community.

Dr. Rhein does not like to get the laugh in this work; but I am Irish and he is not, which reminds me of a story:

A household had employed a new cook—an Irish lady. She was called upstairs and she was asked, "Can you prepare for us a hassen-pfeffer?" The new cook replied, "No, ma'am, I cannot; I can't even spell the darned thing."

A rising vote of thanks was offered to the essayist and the clinician and to the gentlemen who took part in the discussion.

Adjournment.

Second District Dental Society.

April Meeting

A regular meeting of the Second District Dental Society of the State of New York, was held on Monday evening, April 12, 1915, at the Hotel Bossert, Brooklyn, N. Y.

The President, Dr. Stevenson, occupied the chair, and called the meeting to order.

President Stevenson. This year—when you have probably forgotten its President and its officers—will be impressed upon you as a "root canal year"; and I feel, from talks with our members, that we are doing better root canal work this year because of the papers we have had. As the children say: "the last the best of all the game," so we have kept the best for the last, and quite appropriate with his name, we have Dr. Best with us this evening. He will read a paper on "The Responsibility of the Dentist with Relation to Pulpless Teeth."

Dr. Elmer S. Best. Mr. President, members of the Second District Dental Society, ladies and gentlemen: I have been having a very strenuous time in New York since I landed. I left my hotel this morning, and have not been back since; and I shall always remember this, my first trip to New York City. I have probably learned more in the same space of time in New York, than I ever have in all the time I have been interested in and studying dentistry.

(Dr. Best read his paper, which appeared in the July issue.)

Discussion of Dr. Best's Paper.

**Dr. G. J. Grileves,
Baltimore.** It gives me great pleasure to discuss this most admirable paper; in the main I agree with the most of Dr. Best's findings, and we only differ in minor detail, which I will mention later. When Dr. Otto-

lengui asked me here I accepted, with the understanding that my portion of the discussion would be along the lines of the histopathology of the question rather than the technique. This paper bristles with so many suggestions that it is difficult to discuss it without writing another, so I am sure Dr. Best and the society will forgive me if I digress occasionally.

Five years ago I was able to report to this society, after two years' prior work with Dr. W. S. Baer, Orthopedist, Johns Hopkins Hospital, fourteen authentic cases of periapical infection of the blind

type of chronic alveolar abscess, where all of the pathogenic elements were locked in the alveolus and conveyed to the distant tissues by infective emboli by way of the blood stream, which were surely associated with systemic disease. These patients had temperature, at periods, with muscle, joint and heart involvement. There was one case of anaemia and neuritis and others of general malaise of indeterminate type. The clinical picture was typic of a pathogenic alternating poisoning. These cases are recalled to your minds for two reasons: first, because at that time I failed to convince my audience of the seriousness of the situation, and when I stated in my paper that all of the infected roots of these patients were

- extracted save in one case, which was treated surgically by apicoectomy, which then made slow recovery, I was roundly condemned for sacrificing so many teeth, some of the members claiming by this particular treatment to save every abscessed tooth. Second, because there existed the impression that all of the systemic damage occurred by ingestion of pus, as from pyorrhea or fistulous abscesses. This I do not now deny, but still believe that the greater damage lies, as I then argued, in the quiet, apparently innocuous areas, which are often not recognized by the operator and patient.

Every thinking man in our profession now admits, I believe, the seriousness of the conditions arising from focal infective areas about the roots of teeth, but we do not at all agree on the means for preventing or curing such areas, nor are we a unit in interpreting the radiographs, which are frequently the only evidence that such areas exist.

**Reasons
for Extracting
Teeth.**

I wish to reaffirm my stand of five years ago, backed by all the evidence since accumulated, and to say that I know of no method, medicinal, chemical or electrolytic which will surely renew the vitality of the periapical tissues, producing or maintaining a blind infected alveolar area or so clear the area quickly, as to prevent possibility or reinfection. In the class of patients just quoted, who are sick frequently almost unto

death, from toxic periapical absorption, the only method confirmed and variously reported by me in the interim is that of surgery, and as apicoectomy is of doubtful value in multirooted teeth where these conditions most frequently occur, I have found extraction the only expedient. It is also recognized that this results in great mutilation of the patient's denture if not after denutrition, but in my mind there is no other way; with our knowledge to date it is the least of many evils, so we must distinguish sharply between the well and the sick in the treatment of abscessed teeth. No sacrifice of time or effort in those who are well is too great to prevent pulp infection or cure periapical involvement, but in the sick we cannot act too promptly. At the very basis of this question, I believe, lies the manner in which the attaching tissues of the teeth behave, particularly the periapical tissues, which are of even greater importance than the pulp for service after the process of pulp devitalization. Dr. Best has clearly shown us he can remove all of the pulp and sterilize and fill the canal into the very apex yet not through it, and I ask that you consider for a moment a few slides which may refresh our memory even if they appear rudimentary. (Illustrates with lantern slides.)

Histology of Apical Cementum.

Note that the apex of every adult tooth is completed not in dentin, but vital cementum according to the period of development. Prior to and during eruption, there is only the first lamina and further layers are successfully added according to age and use. So as Noyes says (whose illustrations I am using), if you study a number of sections of the teeth of a number of persons of the age of twenty and then of thirty and forty, etc., you will find increasing lamina as age advances, which are in greater bulk at the apex with many lacunæ and canaliculi. Further the pericemental apex is much more open in structure and is supplied not unlike subperiostial bone (which indeed it closely resembles), with nutrient juices in complete circulation, though the penetrating vessels are not so numerous as in bone. On these points all histologists agree, however they may disagree on the supposed circulation via the dentinal tubules, Tomes' granular layer and the lacunæ and canaliculi from the pulp to the peridental membrane in the middle and gingival third of the root.

This is the process of normal cementum formation which, mark you, continues throughout life, and is accompanied by continual resorption at one point and deposition at another, as in the eruption of temporary teeth, and the record of every resorption and repair is written on the root of every tooth in the various lines and cuts in spots refilled, very much like the growth rings in a tree. This secondary cementum differs from the

primary in being more open structure with a greater number of lacunæ and canaliculi. So I would accent the fact that it is possible to say from the invasion and bulging of the regular circumferential layers, just how the fibres were reattached to meet stress from another direction or repair a trauma or an infection. I want it distinctly understood that this is not a pathological condition I am describing, and is most emphatically not hypercementosis, nor exostosis, but a normal physiologic deposit completing the adult apex of every normal tooth according to age, frequently closing smaller apical vessels (as shown in the slides). I believe it is by these deposits that every immediate foramen is after all filled, in successfully treated teeth. Many attempts at pulp devitalization surely interfere with the process; also the continued use of arsenic and of strong formaldehyde preparations (anything over five per cent.). The ionization of zinc in sodium chloride solution, the use of sodium and potassium or intentional perforation when we attempt to open a canal, will greatly endanger, if not surely destroy, the vitality of the apical cementum.

I would also call your attention to the fact that were these necrotic areas to occur in bone, they would in time be sequestered and exfoliated by local osteoclastic and phagocytic supervision, but the difficulty is that the middle and gingival fibres of the periodental membrane retain the tooth in fair function with no pain, so that the patient and often the dentist may not realize the danger of the retention and mastication on such a tooth. There is no such surgical operation quite comparable to pulp devitalization, where we devitalize one tissue, the dental pulp, and leave two, dentin and enamel, out of the six cardinal dental tissues, absolutely unnourished, to be retained by the other three, cementum, periodental membrane and alveolus, and we propose to accomplish this without the damage to attaching and nourishing tissues of the tooth. When infection, resulting in abscess occurs, the nearest approach in surgery to such an operation would be the treatment of osteomyelitis of long bones, and the operation for the removal and repair of the shaft.

**Infections
Through Pulp
Canals.**

The other element of danger to these tissues is infection introduced from the pulp through caries or in the dentist's processes just mentioned, and I wish heartily to commend all that Dr. Best has said in regard to his technique in guarding against every avenue of possible infection, although I do not agree that he can in a few minutes' application of iodine, alcohol, or of any sterilizing agent immediately sterilize the dentin of the field in which he is operating, for in the preparation of teeth for histologic study that takes hours, if not days, soaking in non-coagulating germicidal agents, and I much prefer

and recommend the slow method of sterilizing these tissues before invading the apical regions. This can be done by sealing such agents in the canal with cement. I should fear with Dr. Best's method that I might infect my sterile instruments from the chipping of the tissues on which I was working, for the dentinal tubules of every tooth, which calls for this operation are saturated with pathogenic spores, as Miller has long ago shown.

**Tissue Necrosis
and Infection.**

The two great dangers then, are, *first*, tissue necrosis, which I am sure you and I have induced in the past by our efforts to devitalize and sterilize and operate upon this area; and, *second*, infection, introduced into this necrotic tissue, which we have produced, which area, due to local cell destruction has lost its phagocytic and reparative powers and becomes a fertile field for microbic adaptation. So I should like also to commend heartily Dr. Best's other reference to the newer conception of surgery, that every cell be conserved and as little tissue damaged as possible, this conception going hand in hand with his recommendation to you of the aseptic rather than the antiseptic operation.

I am sure, from study of radiographs of fields before and after operation that I have frequently so lowered the local resistance of these cells we are considering, in my attempt at thorough pulp devitalization and canal opening, as to produce a necrotic apex, a nuisance, needing constant phagocytic supervision, open to infection from septic emboli, as Billings has shown floating, from other focal areas in the body and finally lodging on the apex to produce a blind focal area, previously uninfected; in short, endogenous or hematogenic infection.

**Multiple Areas
of Infection.**

Now I want to say a word about multiple focal areas, and endogenous infection. There are few cases in my experience, where it can be proven that the teeth and teeth alone were the primary portal of entry. This does not excuse the dentist who handles the tooth, but further involves him. As I have just said he often produces the tissue necrosis, a nidus for metastasis, and again these secondary tooth areas are just as dangerous as the primary, for the case does not clear until *all* the focal areas are removed. There are usually three or more portals of septic entry, as the tonsils, sinuses, genito-urinary tract, the appendix, etc., etc. Septic emboli from these areas with an oxygen tension favoring adaptation and growth of facultative organisms, float away in the blood stream to lodge in distant periapical areas of tissue necrosis which we have produced in pulp devitalization, there to induce a secondary focal area even more dangerous than the primary, because it is not outspoken

in symptoms and gives little pain; "catching cold, which lodges on a dead tooth," as an instance. Of these forms who can say, with our present knowledge, in which lies the danger? This is the reason why many hospitals, as someone has said, are "accumulating a bushel of extracted teeth." Given a case in bed at the hospital, every tooth having a resorptive bone area, which must, for want of better knowledge, be the signal that degeneration and not regeneration is going on in alveolus, must be extracted, for again who can say which of these apical areas is producing the serious systemic state, and will any of us assume the responsibility of retaining the tooth at the risk of the patient's health?

I realize the seriousness of this situation and it may in time develop its legal difficulties. That is why I am here. I want to learn, and while I am perfectly convinced that Dr. Best is right when he says that every tooth associated with apparently open bone areas, judged by radiographs and clinical histories, are not necessarily a menace to the health of his patient, I wish Dr. Best or someone else would differentiate accurately. This is the key to this dangerous situation to our profession, but until we can decide which is noxious, and which is not, the sick in the hospital will have to lose all such teeth, for there is not time for continued dental treatment, nor will the internist consent to it. The main lesson is to prevent, or not to produce, conditions in apical areas, in the well patient, which may lead to infection, and this brings up the question of technique of the root canal operation.

Multiple Apical Foramina. I wish to call your attention to the multiple vessel openings shown in the slides, particularly as Broomell, Stein and Noyes have shown that in tooth formation these vessels enter the follicular wall of the papilla just as later they perforate the pericemental apex at more than one point above the main opening. These so-called "inoperable canals" are classed in another article by Dr. Best at ten per cent., and in one case he reports eleven openings for one molar root. From my study of these foramina, my percentage is twenty-five per cent. of all those examined, and the percentage is still increasing.

I want to ask the operators who favor perforating every apex, after seeing these slides and after studying decalcified roots out of the mouth, which one of these vessel openings would they follow, particularly with an agent so destructive of organic tissues as sodium and potassium, and how do they know, in looking into a canal or by examining radiographs which rarely show these openings, how many there are or what is the angle of approach, which is often ninety degrees to the main canal. They might answer: "Oh, well! All that part is resorbed, encysted or encaps-

sulated." Then why not depend on that method, removing all of the pulp, just short of the apex, and let the process of resorption go on in vital cementum, without running wires out into the adjacent bone to get radiographs? Of course, we are considering only devitalization cases, and not the necrotic apex which I believe will rarely respond to any treatment.

You will also recall that Dr. Best reports out of two hundred and eighty-eight radiographs of pulpless teeth studied, "one hundred and seventy-seven mechanically defective operations, with rarefied periapical areas," and "forty-one mechanically defective operations without rarefied areas." Thus a little less than one quarter of the defective root canal fillings produced none of the resorption which we have spoken of as the danger signal. Why? What has taken care of this twenty-five per cent.? There is evidently some curative process guarding and healing this area, other than the mere technique of perfect root canal filling, and it has been my effort to discover how the parts were repaired as some of the slides will show and as I shall demonstrate in a later paper. This is a dangerous subject and what I have to say must not be misinterpreted, and used as an excuse for slovenly canal work or the use of mummifying pastes, "life savers" as Dr. Best calls them, at the apex. I join him heartily in condemning all of this "bluff" and wish to emphasize his statements. No condemnation can be too great for any process or operation that takes chances with the patient's health, for the health of the apex of a tooth is the health of the patient.

If infection of the periapical tissue, induced by necrosis or by alveolar abscess occurs, for which I have no remedy except careful sterilization, or ionization with iodine possibly, and as "pains taking" root filling as can be done. Follow this by the close study of a series of radiographs from time to time. If the field does not begin to clear shortly, apicoectomy, curettage or extracting are the only procedures, for I believe few chronic alveolar areas ever yield to treatment. Where they do recover, I think it can be proven that these apices are taken care of by nature's process, which are the same reparative processes which operate in other bone lesions, and that they are not cured by operative processes. This is said with all due respect to the perfect canal filling, for which I am keen and on which I have spent hours. No other operation is acceptable, but unless the damage you do in the treatment is repaired, unless the cells are in physiologic contact, no root canal filling, no matter how perfect, ever saved a tooth yet, if the attaching tissues at the apex were devitalized in the pulp devitalization, that we might save the patient pain.

Should Root Fillings Extend Through Apex?

My belief is (and I am sure it has occurred in some cases I have examined) that many of the canals will, on examination, show a pedicle of the pulp still remaining vital, with cementum which had not lost its vitality. Remembering that the dental pulp is after all an embryonic connective tissue with low reparative powers, I for one would not "gamble" on this occurring, for at any time a slight interference with circulation may leave the apical third of these canals filled with putrefying necrotic tissue, so far away as Dr. Best has shown from the phagocytic repair, as to become infected by endogenous means. I recommend nothing short of complete pulp removal as far as the finest of our fine files and broaches will reach, but I should rather stop at that, and place the finality of my filling in the hands of a vital cementum so near the vessel opening so that it may be subject to these reparative processes, than to have this root filling protrude into the periapical tissues. The protrusion of the gutta-percha cone seems to be quite the fashion now with many operators. In sealing the apex the question to be answered is: "In placing your filling, are you going, just to, or through the foramen?" Has anybody, except by chance, made as perfect a closure of the foramen as he would make his fillings over enamel edges? How do you polish the ends of your roots, the protruding end of canal fillings? I wish Dr. Best would make all of this clear to us. I consider the protrusion of gutta-percha cones sterilized and softened by chloroform, into the periapical tissues we have just mentioned, as a bad surgical procedure. I am aware of what has been done with metal plates, celluloid tubes and aluminum pins in bone, and that new bone has grown with all of the parts at rest about such foreign bodies, but if you will recall the slides you will see that in the periapical regions it is a vastly different proposition.

You are invading a joint, and in passing the cone beyond the tooth you are only limited by the previous destruction of tissue; if resistance be met, the soft gutta-percha mushrooms on the apex, or encapsules it. In a sinus the cone is extended until it comes in contact with the top of the wall and twists into a veritable "pigtail."

This protruding point may have new bone built about it to a degree, as some radiographs appear to show, but a careful study will reveal a rarefied area near the canal opening which would condemn any other root where the filling did not approach the apex. There is always some point where bone is just about to be formed, but is not. We must also remember that this is a joint, that you have passed through the fibres of the periodontal membrane into bone, and that normal teeth sway and sag in proportion to the stretch of the periodontal fibres and the impact of

occlusion. In the majority of these cases there is great sway, and surely our friends who claim new bone to be built about a foreign body, would say that much would depend on its being at rest and not in motion, even occasionally. Suppose we grant that there is a complete deposition of new bone and that fresh fibres are built immediately about the gutta-percha, and later the approximating tooth is lost and our root tilts, how about this area? Or suppose that these same roots are used later as bridge abutments, how about the relation in the added stress on the bit of tilting gutta-percha then? I have seen many bits of amalgam, points of instruments in encysted root, ends of gutta-percha points at rest in the alveolus, unknown to the patient, or operator, until discovered by radiographs cared for by years of bone repair; but these were not in occlusion, nor did the root project in the mouth. So also are there many cases of bullets, pins, needles, fish hooks, etc., lost in and cared for by the fibrous tissue (which, by the way, make their presence felt at any period of lowered bodily resistance), but who would maintain for a moment that it is good surgery to deliberately introduce such foreign bodies? Finally let me repeat the axiom that, "for repair and health of the tissues every cell must lie in physiologic contact with every other cell." There can obviously be no physiologic contact of bone and peridental fibres with gutta-percha, no matter how sterile. Why not let the giant cells and phagocytes perform their function on non-infected or even infected cells of bone, cementum and fibrous tissue with which they are prepared to deal, instead of introducing a foreign substance?

After two years' study of specimens, ground and decalcified sections of root apices, the histories of which are known, some of which I show you on the screen, I believe it can be established that the apical cementum of the root of every tooth which is successfully treated and filled is absorbed at first down to the point where the cells can lie in physiologic contact, after which there is a secondary deposit of cementum, attaching new fibres of the peridental membrane, the only means by which they can be attached. This can be proven by the difference in the appearance of the secondary cementum, the interference with the regularity of the lamellæ and the hyperplasia at the apex. This is in no way a hypercementosis, nor should it be mistaken for a pathological condition; in fact, it is extremely difficult to draw the line between the normal deposits late in life and cemental hyperplasia. I believe that the filling which finally seals the apex after our best work, and has sealed in the past the buccal roots of upper molars, for instance, is this deposit of secondary cementum, and that it cannot occur in the presence of infection; you will notice in some of the specimens known to be infected, how it is walled up to the very point of infection. So we really never cure an alveolar abscess, un-

less all of the necrotic tissue is removed and the cells can again lie in physiologic contact. After all, the vitality of all the periapical tissue must be preserved or the root canal filling, no matter how perfect, will never restore them to normal relation.

In closing I wish to thank Dr. Best and the society for the privilege of hearing and discussing this conservative paper and to compliment him on the results of his work as shown in the radiographs.

We have a number of our medical confrères **President Stevenson.** with us this evening, and they attest by their presence, as they have on other occasions, that they are deeply concerned in this subject. We know of no one who can discuss this subject from the bacterial side better than Dr. Van Cott, who is the professor of clinical medicine and bacteriology in the Long Island Medical College.

While listening to this very remarkable paper, **Dr. Van Cott.** I must confess I have wondered what right I had to be here; and I was only comforted by looking about and seeing an obstetrician here, and realizing that at least fifty per cent. of his cases had no teeth at all.

It is extremely interesting to me to have heard a man who seems to have absolutely grasped the fundamental principles announced by the men who are the founders of the science of bacteriology.

Infection is the invasion of living tissue by microparasites. Dr. Best has conceived the postulate of Koch, the appearance of the organism, the dose, and the resistance of the host. He is fighting the question from that standpoint, the virulence of the organism, and the resistance of the individual himself.

Dr. Grieves has shown some most beautiful slides, and I am coming pretty close to asking for a diploma in dentistry. This shows us that it is the knowledge of this tissue on which you men are working, that is in a large measure responsible for the combatting of disease.

I have witnessed something over 4,000 autopsies, and the question of the infection through the teeth is by no means devoid of seriousness. I have seen demonstrated time and again the fact that a systemic infection may result from something allowed to remain in or about the teeth.

I remember one case that Dr. Turner knows of—a man who died from an infection—he had temperature and trouble, and he failed to attend to it, and he developed a malignant endocarditis which was traced to the teeth. I have seen the sinuses involved, where the teeth were certainly at the bottom of the infection.

As we do in medicine, you sometimes get immunity, and escape trouble, Sometimes because the patient has an immunity similar to that of the

white rat from anthrax. Some individuals will resist bacterial infection, but there are others who can only resist infection to a certain degree; and it seems to me that is one of the points that one never knows—whether your patient really has a natural immunity.

I was a little disappointed in not hearing from Dr. Best on the subject of vaccines—whether he has used them in his efforts to control the infections in this territory.

I remember as a growing boy, in my impression of dentists, that there were some people in those days who looked down upon them, and I never could see that point, because it seems to me systemic immunity is often the result of careful dentistry, and resistance, which is one of the elements of Koch's postulate, is often the result of careful dentistry.

I certainly agree with what Dr. Best said about

**Antiseptics
Useless in
the Mouth.**

local antiseptics in the mouth. It is absurd. Bacterial investigation has shown that anything that will kill these virulent organisms will kill tissue, and will

do more harm than good, as these gentlemen have said. Think of trying to sterilize the teeth with these germicides that are advertised! Either they do not exist as germicides, or they exist as harmful agents which should be left alone.

I want to say a word, but I do not know how

Dr. Chaddens P. Hyatt. it will be greeted—I know how some of my remarks in the past have been received. I have listened intently to all the talk this evening on pulp chambers and root canal work, and while it would be fascinating to equip my office with all the paraphernalia necessary to do this exquisite work for the preservation of pulpless teeth—I think it may be so fascinating that we might overlook the most important part—which is never to have such teeth to take care of. I think that can only come about by the wise instruction by the dentists of the public, so that they will take care of their teeth. I do not think there is a baker's dozen of men in this room who can really claim that they are doing this work properly—and that may be a bold thing to say—but we hear men say they are only taking a half hour for such work, and they do not want to waste their patient's time, and they are men for whom I have the greatest respect. Either I am mistaken, or I am ahead of time, but I think the greatest work for us to do is to try to discover how we can prevent the dental lesions, and never need to use arsenic or pressure anesthesia to take out the pulp, and then we will not have to do the things that were shown to-night. That is the great point, the preventive measure, rather than this fine technique and the wonderful instrumentation for the removal of the pulp from the pulp canal.

I think preventive dentistry can be practiced, and I think in the



future the dentist will study more along those lines, and all these other troubles will be prevented.

Dr. M. L. Rhein. Most of you are aware that I am somewhat interested in this subject, and I feel that I do not want to let this occasion go by without complimenting Dr. Best on the magnificent presentation he has given us to-night.

It has been a great pleasure to me in looking at his radiographs to see that he has practically grasped the point of absolutely sealing the entire foraminal ends. In a conversation with Dr. Best this afternoon, I learned that he was erroneously under the impression that I deem it necessary that the root filling should protrude some distance. I am very sorry if my use of the English language has been such as to have conveyed any such erroneous conception.

In trying to demonstrate the results, which I have obtained by many years of clinical research devoted to this particular subject, I finally concluded that it is absolutely necessary that the foraminal end should be sealed, and that means that the minutest crater must be sealed, from the periapical aspect, if such a root is to be left in a condition where future infection is impossible.

I realize that this is entirely in accord with Dr. Best's views.

I want to say a word in regard to Dr. Grieves' discussion. We are all human, and liable to error. Either Dr. Grieves is wrong, or I am wrong. I base my statement of facts on both bacteriological tests and radiographic proofs, taken years after the work has been accomplished.

I do not agree with Dr. Grieves' patho-histologic presentation which he has given us. He speaks of the deposit of cementum around the apices of the roots in this extraordinary way, and calls it physiologic. If we view a great many radiographs of teeth, we will find that only a small percentage presents this condition of affairs, and this condition, while it is unquestionably an act of Nature trying to protect itself, is pathologic. It is due to an irritation which produces the excessive amount of nutritional matter; that brings about exostosis.

It is the first time I have ever heard anyone make the claim that this can be considered a normal condition.

In his discussion Dr. Grieves lays great stress on the difficulty of sealing multiple foramina when they exist, and he is right. Unless all these microscopic entrances to the pulp canal are sealed, the operation cannot be considered a success, and my claim is that the technique must be of such a nature that all these canals will be sealed, not in a haphazard way, but hermetically sealed with such a homogeneous mass, that there is absolutely no possibility of any leakage.

One of the strongest clinical facts in contradiction to Dr. Grieves' presentation, has been my record book in regard to many cases—I may say a few hundred cases—where, what we formerly would consider a very creditable root filling extending almost to the apex—not through—in some cases not as far as that—were followed by a pericementitis and by the loosening of a tooth that was formerly tight, and there is an exudate. I leave it to you my fellow practitioners, when you have thought that you did an extraordinary good piece of work and this has been the result, what is the reason?

The reason is, you have left at the end of the root living tissue such as Dr. Grieves has presented to us, but the condition is abnormal, it is pathologic. We get the inflammatory reaction that produces this hypercementosis that follows. It produces the pericementitis. It makes the tooth loose without apparent cause. Over and over I have followed up such teeth that have come back after the first operation, and in the second treatment I have filled through the foramen, after using sodium and potassium, which by its marvelous facility for searching out every particle of organic tissue, if properly used, had removed from the apex all those microscopic contents, and the result always has been that the pericementitis has disappeared, the tooth become tighter at the end of twenty-four hours, and the exudate has disappeared.

Now as to what he said about passing a large mass of gutta-percha through a foramen. We do not aim to pass through a large mass. But when it

Filling Through Apical End. does occur, if aseptically done, it is encysted. I have the radiographic proofs to show that osseous regeneration takes place, notwithstanding the fact that a large mass of gutta-percha had passed through. I did not want to pass that mass through there. Such an occurrence simply shows the limitations of my own skill; but I do claim that when you get osseous regeneration years afterwards—when the destroyed bone shows that it is being replaced, it is to my mind very good scientific evidence that the mass of aseptic gutta-percha was harmless.

I have said many a time that the percentage of cases that can be treated, so that reinfection cannot take place, is dependent on each man, and when it cannot be done, the tooth must be extracted. I do, however, in the cause of conservative dentistry, feel that we should not forget the inordinately great value of the human tooth, as compared with any artificial substitute. There is such a thing as going to extremes in the loss of the human teeth.

I had the honor, at what was known as the White Mountain meeting of the ITEMS OF INTEREST, of introducing to the profession at that time, the great value of ionization for absolutely extirpating foci of infection,



if the root of the tooth itself was not necrotic. I have not a single case up to the present time on my records to contradict that assertion. I have had a number of cases where, through the difficulty of properly reading a radiograph, I have attempted ionization, and had to have recourse to apicoectomy afterwards, because the root itself was necrosed; but under no other circumstances have I met failure.

I do not want this occasion to go by without laying due emphasis on that; because if it were necessary always to resort to apicoectomy, a great many useful teeth would be sacrificed that can be and are properly being saved.

I am deeply interested in the subject under discussion, but I believe it would be unwise for me to consume time discussing root canal technique. I do want to take a few moments in stating what I believe to be a greater problem at the present time than the working out of a perfect root canal technique, though the one problem, in a measure, is dependent upon the other. The sad reality faces us to-day that our hospitals are filled with patients who are bed-ridden; some crippled for life and aye, many of them dying, as a result of focal infections about the teeth and jaws. There is no longer any question as to the large variety of systemic diseases that are due to oral infection, and herein lies the great problem that is before you gentlemen to-day. I dare say if you would come to the Post-Graduate Hospital and School of Medicine on any Thursday morning (and I extend the invitation to each and everyone of you to do so), you would be astounded to see the number and character of cases that are sent down to my clinic in oral surgery from the medical and surgical wards. In most every instance, a radiographic and bacteriologic study of infected areas in the mouth reveals the relationship between oral infection and systemic disease. Some of the cases with cardiac lesions and others with pernicious anæmias succumb to the disease because they reach us too late to be benefited by our treatment, yet many of the cases respond to the removal of infection from the mouth and jaws and the use of auto-gogenous vaccines. In the cases of polyarthritis, where structural changes have taken place within the joints and atrophy of the limbs have resulted from prolonged non-use, only slight improvement will take place because the damage is too great to permit of repair. It is therefore incumbent upon you to exert yourselves in the direction of prophylactic measures and thus prevent these serious diseases of mankind, rather than advocate futile efforts at curing them when the damage has been done.

It is well for the masters in dentistry to work out a technique for the treatment of pulless teeth, but there is this greater problem before you; what are we to do in the meantime?

**Evil Results
from Evil
Bridge-work.**

I have noticed in the study of hundreds of cases in our wards that the patients who seek charity at our hands give evidence in their mouths of having spent considerable money for the type of dental work that is common in the dental parlors and among un-

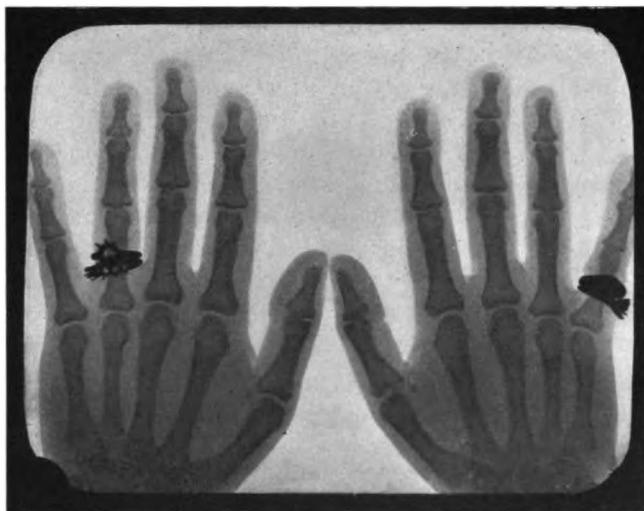


Fig. 1.



Fig. 2.

scrupulous dentists who are putting gold crowns and bridges in mouths, without regard to the damage that such work produces. In view of our present knowledge of the dangers of such practices, *it should be considered a crime to put a gold crown or bridge upon a tooth, unless that tooth is properly prepared to receive it.*

Radiographs of the part is the only sure means of determining whether a healthy condition exists about the apex after the root canals have been treated and filled. Crowns and bridges must therefore be considered a luxury, which should only be indulged in by wealthy persons, and no work of that character should be attempted in the light of our present knowledge upon poor patients unless similar methods are applied.



Fig. 3.



Fig. 4.

**Evils of
College Infirmary
Work.**

Think of what is going on in every dental college to-day! Students who have but the slightest chance of treating a root canal properly are permitted to practice upon living subjects. Many of you who are in practice for years find it your greatest difficulty.

Is it not a crime that our dental colleges should take such a risk with the health of the confiding patients who come to their clinics? Persons so treated in most every instance are taking a risk almost as great as if they were inoculated with a poison which sooner or later will sap their vitality and end their lives. If we do not take steps to end this nefarious crime, the government will. There are laws enacted to protect the health of the public through providing pure food, free from any dangerous in-

gredients, even though used in small quantities. Our municipality is spending vast sums of money in the preservation of health, and I wish to say that when the public, backed by the medical profession, begins to realize the full amount of harm that is being done through poor and inefficient dental work, there will be an upheaval that will cast reflection,

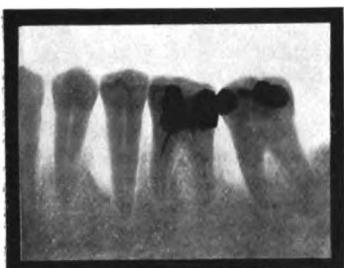


Fig. 5.



Fig. 6.



Fig. 7.

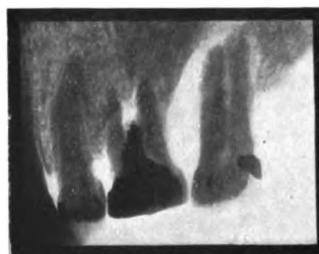


Fig. 8.

not alone upon the unscrupulous practitioner but upon you men as well, who are anxiously and seriously thinking of this question from your own standpoint. I claim this is the big problem before you to-day, and it is necessary for you to solve it lest it be taken from your hands.

In speaking to Dr. Ottolengui on the telephone to-day, I promised him to bring along a few slides to illustrate some pertinent points bearing upon the subject.

The first picture (Fig. 1) is a radiograph of the hands of a patient showing a normal appearance of the joints. Fig. 2 shows the condition known as arthritis deformans, from a radiograph which I made for a patient many years ago who was suffering from pyorrhea and in whom I suspected the relationship between the two diseases. You can well

imagine from the appearance of these joints that even after the removal of the mouth infection, little benefit would be felt from the treatment, even though autogenous vaccines were administered.

Fig. 3 shows the great amount of resorption of the alveolus that takes place about the necks of teeth as the result of pyorrhea. It is an example of the type of case that can be cured by thorough treatment, namely thorough instrumentation and medication so as to remove all deposits from the teeth and all germs from the pyorrheal pockets. At this

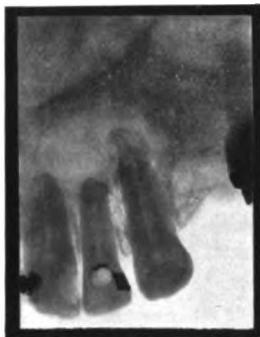


Fig. 9.



Fig. 10.

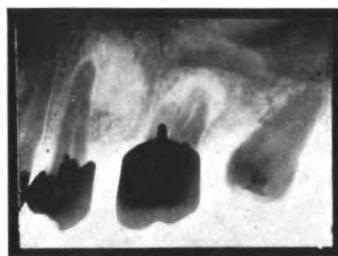


Fig. 11.

point, I desire to state that it is possible to cure pyorrhea but extremely difficult to prevent its recurrence.

Fig. 4 shows extensive pyorrhea with marked infection about the teeth, that was responsible for a pronounced case of polyarthritis. It would be wrong in a case like this to treat these teeth with a view to saving them, and I wish to take serious issue with those men who are so eager to practice their specialty, and try their skill, that they are ready to endanger the life of the patient rather than resort to free extracting in such

instances. We need a few hundred Billy Sundays to go through the country before the members of the dental profession to preach, not alone the doctrine of prophylaxis, but the wholesale extraction of teeth when they are likely to menace the health of our patients.

Figs. 5 and 6 show pyorrhea with deep pockets in two patients that had suffered systemic effects. Fig. 7 illustrates the manner in which the instrument is passed up beneath the gum flap and the tooth so as to permit of the scaling of the root at the extreme depth of the pocket. Fig. 8



Fig. 12.

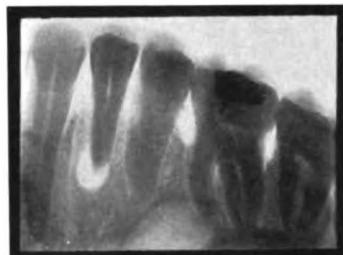


Fig. 18.



Fig. 14.

shows an extensive resorption of the process about an upper second molar tooth and infection between the roots of the first molar as the result of a perforation at that point. Fig. 9 shows an extensive apical infection involving the roots of the upper central, lateral and cuspid teeth. The patient had no local symptoms to indicate that she was suffering from so an extensive destruction within the bone. Figs. 10 and 11 show extensive areas of infection in the bone above the teeth as the result of poor dental work. One of these patients was a chronic invalid suffering from a disturbed condition of her nervous system with persistent insomnia which was amenable to no treatment until I operated upon the patient cleaning out the large area of disease. Figs. 12 and 13 show infection about the apices of teeth that were free from caries and which gave no external evidence of the disease existing about the roots. The bicuspid in Fig. 12 contained a putrescent pulp which had evidently died from some trauma. Fig. 13, though strongly suggesting an apical abscess due to infection

from the pulp canal, was a vital tooth surrounded by a pericemental abscess of pyorrhea origin. Fig. 14 is an excellent illustration of the difficulties that you gentlemen encounter in the treatment of root canals. Here are three adjacent teeth, each one showing its own peculiarities as to root formation and arrangement of the pulp canals.

I hope I am not attacking this subject from too unpopular a stand-point. Dr. Grieves has referred to the bucketful of teeth found in many of our hospitals. I do not discriminate, as he does, between those persons who are well and those who are sick. It is much more important for us to preserve the health of patients than to attempt to cure them after they are stricken with a deadly disease. I think much good would come from the more free use of hygienic plates, and the elimination of unhygienic bridgework.

I want to make myself clear on one point. I

Dr. Best. have used the expression "flush with the surface—through the foramen—sealing the foramen"—but I do not seem to have conveyed my idea. Dr. Grieves misunderstands me, and Dr. Rhein misunderstands me. I am going to use an illustration; it is rather a coarse one, but it may convey my idea. We will say, for instance, we have two holes cut in this table. We have a large knife, which just comes even with the surface of the table. We will say that Dr. Grieves has his head through this hole and Dr. Rhein through that one, and the knife comes along and just takes off both heads (loud laughter)—which God forbid should ever happen. What we have left is flush with the surface. Now do you understand what I mean? (More laughter.)

Another point Dr. Rhein raises is in regard to preventing future infection. If the periapical tissue is infected, and Dr. Rhein does not sterilize it with his ionic medication, it matters not how he encapsulates the root apex, he will not have cured the infection. That is the dangerous point.

Vaccine Therapy. I differ with some of my dental friends in regard to the vaccines. There is so much of this work to do, that I find myself daily limiting the things I am attempting. I think the internist with whom we co-operate should do our vaccine work. I may be wrong, but I do not believe I have any right to use vaccines on my patients. I firmly believe that it is the field of the internist, and when he sends a case to us and says: "I have gone over this patient, and examined him thoroughly for every focal point of infection, and I cannot find one, and I hope you will find it"; when the internist is willing to adopt that position, let us turn over to him the work which I believe rightfully belongs to him.

Dr. Schamberg raised the question which is spreading with more or less rapidity among physicians and surgeons. The initial attack we got from Dr. Hunter. Although we resented it at the time, I believe it has done more for us than anything that could have happened to us. Many of us did not believe it at first; but when we analyzed the situation, we found he was right. At the same time, I cannot accept Dr. Schamberg's statement that crown and bridgework cannot be placed in the mouths of many of these patients to advantage.. I believe that a crown properly contoured, and with proper anatomical restoration, does more good than if that tooth were replaced with an artificial substitute.

I appreciate more than I can express to you the spirit in which this paper has been received. I consider it a compliment to the Second District Dental Society that not once has that old cry been raised : "How are the people going to pay for it?" It used to be raised every time the question was brought up, and that is a question which I cannot answer.

I thank you more than I can express.

Dr. Schamberg feels he has been misunderstood,

Dr. Ottolengui. and he would like to say a word more.

I would not want to be quoted as disapproving

Dr. Schamberg. of all crowns and bridges ; but I believe it is essential that the practice be restricted to *good* crowns and bridges. The gentlemen collected here are but a handful of the men who are in the profession—and there are thousands of men who are turning out work that is doing more harm than good.

The hearty thanks of the society was voted to the essayist.



Review of Articles and Discussions on Root Canal Treatment.

During the winter we have been withholding various articles dealing with the subject of root canal treatment and filling, and the treatment of periapical infections, with the intention of publishing them all together as a symposium, that the student might have varying opinions in juxtaposition for his consideration. The material, however, proved too voluminous for the space available in a single issue, so that some appeared last month and more will be found in this number.

The use of a plastic substance of some sort, which in theory at least will fill a canal if all pulp tissue be removed, and preserve what is left, if any

**Root Canal
Pastes.** be left, maintaining the same in a condition immune against the attacks of micro-organisms, is so attractive a method that it is not strange that the recommendation, varying only in formula, is presented so frequently. If comment is now made upon Dr. W. I. Prime's communication, it is by no means personal, but merely to emphasize the errors of his proposition as a lesson to hundreds of others who hold quite the same notions and practice in quite the same way, only, perhaps, without the courage to confess in print.

The salient points in Dr. Prime's paper are: First, he never uses the dam, but trusts to washing out canals with tepid water and instrumentation to cleanse his canals. Then a paste is forced in until the patient gives a signal for stopping, because pain is felt. In the presence of

putrescence he relies on phenol applied on paper cones and repeated till there is no odor.

Thus, in spite of all that has been written of the dangers of systemic infection from periapical abscesses, this practitioner is willing to recommend over his own signature the treatment of root canals unprotected from the bacteria in the oral cavity, and to count a root canal to be sterilized on the day when he cannot detect the presence of bacteria with his olfactory organ. It is to be hoped that Dr. Prime and others who share his views will really read all the papers and discussions in relation to root canal work in this and the last issue, and that they may profit by what the real students have to say.

Reverting, however, to the subject of canal pastes, so long as men can purchase these sure-pop cures for all root canal troubles and rely upon the lies on the labels to salve their consciences for adopting these lazy man's methods, it is almost useless for the chemical scientists to declare that the pastes are worthless.

**Duty of the
National Dental
Association.**

If the reorganized National Dental Association really means to emulate the methods of the American Medical Association, after which it has been patterned, it is high time for the Research Commission to attack this question of nostrums.

All these canal pastes should be scientifically tested, and when proof has been accumulated that they are not only worthless, but actually harmful, since by the engaging advertisements that go with each package, dentists are tempted to fill canals with them, with the result that thousands of innocent patients have their health and lives endangered, then the National Dental Association should petition the Federal authorities to prohibit the further sale of such dangerous compounds.

We have been asked whether the dental profession will take the next step which must be taken in preventive medicine. This is the step that should be taken. The prevention of the continued poisoning of the people by abscesses resulting from the use of these baneful nostrums. We have been praying for this grand National Dental Association, and bragging of what we would do with the organization. Well, the day has arrived; we have the organization; the opportunity is ours. What are we going to do about it?

Antiseptic Canal Operations.

Dr. C. Edmund Kells denies the possibility of aseptic root canal operations, and advocates the use of antiseptics; but in this symposium he will find none to agree with him. Not only is it declared that the aseptic root canal operation is possible, but both medical men and dentists claim that it is worse than useless to rely upon antiseptics. The classic surgery of to-day removes all infected tissue with aseptic instruments and hands, after which dressings are used, not charged with antiseptics as formerly, but with such agents only as will maintain the immunity of the wounded parts, contributing to healthy granulation tissue, and serving as a barrier against the inroads of pathogenic micro-organisms. This is just as essential in root work, or in periapical surgery, as elsewhere in the body, and no other course offers the slightest promise of a permanent cure.

It is true, as Dr. Kells says, that the vast majority of dentists to-day are not doing aseptic surgery when dealing with root canals; it is, as he announces, a pernicious practice to wrap cotton on a broach with dirty fingers and place that cotton as a dressing into a root canal. But it is possible for men to wrap cotton on their broaches with their fingers covered with rubber shields taken fresh from alcohol jars and using cotton which is continuously kept in the sterilizer.

No, it will not answer to rely on antiseptics, because our fingers are dirty. We must recognize the danger to our patients of treating their root canals in any but the most aseptic fashion, and then we must sit at the feet and learn from those who have perfected aseptic methods of practicing in this important field.

**Protrusion of
Canal Fillings
Through Foramina.**

Dr. Clarence Grieves in this issue, in discussing Dr. Best's paper warns against the protrusion of a canal filling through the end of a root, while Dr. Rhein and others contend that no root canal which has been putrescent can be counted as properly filled unless the canal filling passes quite through the foramen, thus perfectly sealing the same.

Thus is set up a distinct difference of opinion, and the sooner this controversy is determined the better, because of the prominence of the two men. Certainly Dr. Rhein's long and arduous labors in this field,

and the fact that he has practiced his method for a great number of years, keeping voluminous radiographic records and case histories, entitles his views to the most serious consideration. On the other hand, the fact that Dr. Grieves cites Drs. Black and Noyes to the defense of his views in regard to renewed growths of cementum about the ends of the teeth, makes one feel that the subject must again be carefully studied.

Dr. Grieves tells us that these growths are physiologic, while Dr. Rhein declares that they are pathologic. Dr. Grieves describes what he calls secondary cementum as "a process of normal cementum formation which continues throughout life," etc., etc. But he does not make it clear that this can occur, or that it does occur after the death or removal of the pulp; and if it does, why should it be counted physiological? Is secondary dentine, the product of a perverted stimulus set up within the pulp by some irritating agency, a physiological or a pathological tissue.

Dr. Grieves opposes even the encapsulation of the end of a diseased root with gutta-percha, and declares, even where regeneration of bone is shown by radiographs under such conditions, that he can detect an area of rarefaction close to the gutta-percha and just at the apical foramen. Of this he says: "There is always some point where bone is just about to be formed, but is not."

This argument is based largely upon a reading, or perhaps upon a misreading of the radiographs which have been exhibited. The places which Dr. Grieves claims show rarefaction are merely places in which no actual bone has been laid down, or else where the bone if present is not sufficiently dense to stop the passage of the X-ray. This is not rarefaction in the sense in which the term is used in diagnosing diseased tissue, nor to the eye of an expert does one look at all like the other.

It would, of course, be a satisfaction to those that claim they can cure periapical disease to be able to prove conclusively the entire filling in of the abscess cavity with new bone. But the success of their advocated methods and the soundness of their doctrines do not depend upon the restoration of new bone. It is quite sufficient if the parts are restored to health and all disease eradicated. These men would be quite contented if skillful dissection, by competent anatomists, would find those little places near the foramina which Dr. Grieves calls rarefied, to be filled with healthy granulation tissue. That this is the case is most

probable. That these so-called rarefied areas are diseased, or even prone to disease, case records abundantly prove not be the case.

During the discussion Dr. Grieves challenged those present to tell him how to differentiate between the curable and incurable cases. None replied, but there is no difficulty about replying. Those who are skilled in reading radiographs can readily detect a truly necrotic apex, and in such conditions, apicoectomy usually is a reliable procedure, though, as Dr. Grieves truly points out, not so useful in the molar region. Where there is no actual death of the end of the root, or where its existence cannot be positively determined, aseptic root canal treatment and filling promises a cure, and if the promise be not fulfilled the end of the root may even then be amputated, with the assurance that the main portion of the root is not a contributing agent in the continuance of the disease.

Of course, Dr. Grieves argues soundly when he declares that with the patient ill in bed, suffering from infection which might be traced back to the tooth, the internist is entirely within his rights when he sacrifices a tooth or teeth rather than risk the life of his patient.

But Dr. Rhein also is correct in making a plea for the salvation of all teeth where opportunity affords. If the patient is not bed-ridden, and can make the visits to the office, it not infrequently happens that from the very initiation of treatment a betterment of conditions begins, so that the patient is increasingly able to endure the sittings needed. And in the end he not only has his health, but likewise his tooth or teeth.

It is to be hoped that Dr. Grieves will continue his researches, as well as all the others who are at present teaching and preaching better methods, with the hope of attaining better results.

Prominent in this field we have always had Dr.

Callahan's Methods. Callahan, and his two papers in this issue should be carefully studied. We have long had his views on the use of sulfuric acid, but it is most interesting now to read what he says of the use of sulfuric acid after the utilization of sodium-potassium. And one is immediately desirous of experimenting with the process suggested by Dr. Herman Prinz; the substitution of hydrochloric acid and sodium dioxide for the sulfuric acid and bicarbonate of soda. If the results are but half so good as promised they will be most useful.

In regard to Dr. Callahan's rosin method, that likewise seems a very

rational and useful proposition. But when he speaks of pumping a cone up and down in a canal forty or fifty times, finally getting it to the end and forcing the rosin into the dentinal tissues, it is evident that he can enlarge canals to a larger bore than most men.

**The Problem
Yet to be
Solved.**

It would seem, then, that we have practically perfected the technic of chemically cleansing out canals, and where they are large enough we have most satisfactory methods of filling them. We still need a safe mode of enlarging the canals after cleansing, so that we neither fill them up again with débris nor drill false pockets into or through the sides of the canals.

For this we require a better system of instrumentation, and for this we must have better instruments than have yet been devised. But several minds are at work on this problem, and it will undoubtedly be solved.





THIS IS THE TIME of year when some folks do their "Spring Cleaning."

♦ I never hear of "spring cleaning" myself but I think of the Dear Old ♦ Lady down at Atlantic City who rents out bathing suits, and openly ♦ declares it to be her opinion that "everybody ought to take a bath once ♦ a year, whether they need it or not." However that may be, I have been ♦ doing a little "spring cleaning" in and about my desk, and I have col- ♦ lected several communications which have reached me during the past ♦ few weeks, intended for discussion, Around the Table, but which thus ♦ far have been overlooked in the talks. They are not exactly all on the ♦ same subject, but it is possible to take a number of different colored ♦ little stones and put them together so that they form a fairly good ♦ picture. So we will just glance through the letters and comment thereon.

■ ■ ■

DR. PRESTON, of Roanoke, Virginia, writes as follows: "My partner, Dr.

♦ Porter, tells me of his visit to your office recently, on which occasion ♦ he saw you use wax instead of unvulcanized rubber for pressure anes- ♦ thesis. May I call your attention to another method? Prepare the ♦ cavity as usual, put in the novocain, neurocain, or cocaine, coat the ♦ cavity margins with a cavity varnish and use temporary stopping. The ♦ varnish prevents slipping and leakage, and the stopping 'stays put' ♦ when pressure is applied. The cavity may be overfilled if you wish the ♦ patient to supply the pressure by biting, but cotton need not be used ♦ as would be required with the unvulcanized rubber, as the solution does ♦ not escape into the patient's mouth. I have found this method better ♦ than any other that I have tried."

■ ■ ■

I HAVE NOT TRIED this method as yet, but it sounds good, all except

♦ that about allowing the patient to bite on the gutta-percha. That would ♦ seem to indicate that no rubber dam is in place, and the Professor of ♦ asepsis, a prominent member of the Around the Table Club, in- ♦ sists that no pulp operation of any sort should be attempted without

Items of Interest

- ❖ the protection of the rubber dam. He says it is hard enough to perform an aseptic operation with the dam on, but absolutely impossible to exclude infection otherwise.

■ ■ ■

THIS IS ONLY *en passant*, as we Frenchmen say, to which we may add "revenons nous à nos moutons," which in New York English means getting back to the main subject, which is pressure anesthesia. When first described for pulp work the use of unvulcanized rubber was advocated, and it did have the disadvantage of permitting the escape of the fluids. But once I was in Chicago, and I informed Dr. Hart J. Goslee that I wished a pulp removed. He offered to remove it for me painlessly! Painlessly, with a capital "P." That sounded very good to me; but while I wanted the demonstration, I cannot say I was so eager about it that I kept reminding him of it every three or four minutes. In fact, it was three or four days later, and just half an hour before my train was to start, when I remarked in a casual, impersonal, absolutely disinterested sort of way, "Oh, by the way, Goslee, we have forgotten to remove that pulp of mine!" Now, that was not what one might have called strictly true. He may have forgotten about that pulp, but I should not have said "we," because I had not forgotten it for one little minute.

■ ■ ■

VIRTUE IS ITS OWN REWARD, say some of the philosophers, and I

- ❖ suppose the liar reaps his own crop of regrets. At all events, you can imagine my feelings when Dr. Goslee remarked, "We have plenty of time; we will do it at once!" That gave me the first real inkling of what patients must think of us sometimes when we pass them little jests like that. But what could I do? However, why burden you with the harrowing tale. Suffice it to say that I caught my train, minus the pulp, suffered absolutely no pain, and, as they say, "went on my way rejoicing."

■ ■ ■

THAT WAS MY FIRST introduction to pressure anesthesia using bee's

- ❖ wax, and I have adhered to the method ever since. Do you blame me?
- ❖ As I said before, I have not yet tried the temporary stopping method,
- ❖ and it may be superior to the wax, but one advantage of the wax is
- ❖ that it yields nicely under pressure, and finally the burnisher may be
- ❖ pressed hard enough to go through the wax, and when this can be
- ❖ done without pain, the anesthesia is complete.

■ ■ ■

HERE IS AN INQUIRY all the way from Vancouver. Dr. B. S. Hanna

- ❖ asks: "Do you know anyone who has examined a tooth under the microscope to see the effect on a cavity soaked with nitrate of silver and then plugged with amalgam? I have often wondered if there is
- ❖ any union between the silver of the nitrate and the amalgam, which
- ❖ would prevent the recurrence of decay forever, or nearly so. I have
- ❖ often done this and have never had to remove a filling."

■ ■ ■

I CANNOT ANSWER this question. To be entirely frank, I never heard

❖ the method before. Moreover, it is difficult to see what is to be gained
❖ by the use of the nitrate of silver. Usually amalgam blackens a tooth
❖ quite enough without any additional factor, though whether the nitrate
❖ of silver would cause discoloration under the circumstances is yet an-
❖ other question. Nitrate of silver has been used in deciduous teeth and
❖ on sensitive surface abrasions with more or less success. In the latter
❖ case the theory is that the acid mucous causing dissolution of the
❖ cementum and dentine about the neck of a tooth exposes the dentinal
❖ tubuli, so that that portion of the tooth becomes highly sensitive, and
❖ the application of a concentrated solution of nitrate of silver supplies a
❖ surface covering, which protects the part from further irritation.



THE USE OF SILVER NITRATE, however, usually causes a discoloration

❖ which is most unpleasant, especially in the front of the mouth. For the
❖ incisors and cuspids, therefore, usually a preferable and equally potent
❖ method is to use a smooth burnisher in the engine and burnish the sen-
❖ sitive place at the neck of the tooth, using considerable pressure. The
❖ theory here is that the forceful burnishing closes the openings of the
❖ dentinal tubuli, and thus sets up a temporary barrier against the acid
❖ mucous. This, however, is of course only temporary, and it is neces-
❖ sary either to repeat the burnishing occasionally, or, better still, to have
❖ the patient bank about the necks of the teeth at night a paste containing
❖ a strong alkaline agent which will counteract the acid mucous.



THERE IS NOTHING NEW under the sun, except, of course, my own

❖ ideas, and perhaps a few of yours; yet it is true that everything is new
❖ to a man the first time he thinks of it, or the first time he hears of it.
❖ Dr. Brittain, of Boston, says that the following method of repairing a
❖ broken facing on a bridge is at least new to him. Perhaps it may be to
❖ others. No harm to print the Dear Old Method once more, anyway.
❖ The old jokes are always the best jokes. Guess that is why they get
❖ old. The bad jokes die "aborning."



"TO REPAIR FACING broken from a bridge, take a square-edged car-
❖ borundum engine wheel and cut a slot in the backing. Bevel the edges
❖ on each side of this slot. Fit the backing till satisfactory and then at-
❖ tach pattern wax over the pins; force into the beveled slot, remove and
❖ cast gold direct to the facing. This gives a facing with a gold slab at
❖ the back, which will slide nicely to place and when cemented will be a
❖ firm attachment."



SOMETIMES THIS is true, and sometimes it is not. Once in a while that
❖ facing will come out checked. Then, if you have no other that just
❖ matches, you can begin another hunt for another facing.



A VARIATION of the above method is to slip two little platinum tubes over
❖ the pins before adding the pattern wax. Then when the pattern has
❖ been made the wax can be removed from the tooth and cast separately,
❖ after which it may be cemented to the facing, and that in turn cemented
❖ to the backing.

A VOICE FROM THE OTHER END of the table cries out: "Why not
❖ make the holes in the old backing in the first place and just cement the
❖ facing to place and be done with it." Bravo! Likewise, "Good Boy!"
❖ It has been done successfully. If you are skilled enough to grind the
❖ new facing to place, you can either do as the Voice suggests, or as Dr.
❖ Van Woert recommended long ago. After drilling out the old pins,
❖ connect the two holes, bevel the sides mesially and distally, and then
❖ when setting the facing force the two pins in opposite directions and
❖ pack in a little amalgam while the cement is still soft. A facing can be
❖ replaced in this manner at a single sitting, and if well done is a per-
❖ manent operation.



DR. LOUIS H. GILBERT, of Rochester, N. Y., describes a method of cutting sensitive cavities with less pain. He says: "Up to the middle of last August I had administered nitrous-oxide and oxygen for painless operating more than a hundred times. Since then I have needed it but four times. Concluding that the major part of the pain is produced by the frictional heating up of the bur, I tried having my office girl pour a stream of cold water upon the bur while I operated, the saliva ejector drawing off the surplus water. I think also that the tooth, when chilled, conducts sensations less readily, as is demonstrated with the ether spray. I have been advised to color the water that the patient may receive the suggestion that a pain preventing agent is in use. This is probably a good idea, and no doubt suggestion plays a large part in all our work."



THE ABOVE REMINDS ME of so many things I hardly know whether
❖ there is time to tell all of them. That is the beauty about this talking
❖ Around the Table. One idea leads to another. First, then, the scheme
❖ of having the office nurse flow water on the bur. That reminds me
❖ that I once had my teeth cleaned by Dr. Taggart. He did not use
❖ pumice, but powdered silex; and, by the way, I have used silex ever
❖ since. It is more rapid than pumice and tastes less like "dirt," if you
❖ get my idea. Dr. Taggart would mix his silex with water, to the consistency
❖ of thick cream, and his nurse would suck this into the cut off
❖ nozzle of a chip-blower, and then drop it onto the teeth as Dr. Taggart
❖ signaled for it. Whether using engine brush, rubber cup or hand polishers,
❖ this saved time for the dentist.



ANOTHER LITTLE METHOD of which Dr. Gilbert's proposal reminds me
❖ is accomplished with a device constructed by Dr. Van Woert. By the
❖ way, that Van Woert person has a lot of good ideas. In this particular
❖ case he has a tiny metal tube soldered to his handpiece in such a manner
❖ that the end of the tube is directed toward the bur. To the other end
❖ of the metal tube is attached a small rubber tubing leading to the compressed
❖ air outfit. When using the bur, the compressed air is turned on
❖ and a stream of cold air keeps the bur and tooth cool and the cavity
❖ clear of bur dust.



Around the Table

IN REGARD TO SUGGESTION, I am reminded of several things, but it

- ◆ is too late to go into that now, as I find that I have overlooked two
- ◆ communications which should have been read to the Club last month.
- ◆ However, they are just as good now. The first is from a Massachusetts
- ◆ dentist, and is good reading. But he asks me not to mention his name
- ◆ if I quote from him. I suppose because he calls himself an Average
- ◆ Dentist. According to my view, he is much above the average.



"I HAVE BEEN READING with considerable interest your long-distance

- ◆ discourse in the current 'Items of Interest' on the subject of root canal
- ◆ fillings. Like many others, I feel considerable interest in the subject
- ◆ and in the expressions of the men whom we regard as leaders in the
- ◆ profession on the subject.



"NOW, DOCTOR, DON'T YOU THINK that there is such a thing as edu-

- ◆ cating the public to a point beyond its own welfare? Just suppose that
- ◆ a patient of Dr. Hartzell's, or some one of the others you quote, were
- ◆ to be in a position where it was necessary to secure the services of a
- ◆ dentist with the least possible delay. And, further, that that dentist
- ◆ found a dental pulp which in his judgment required extirpation, and that
- ◆ he removed that pulp and filled the root canal according to the best of
- ◆ his skill and experience, and then dismissed that patient as having had
- ◆ the necessary service performed, what, in your judgment, would be the
- ◆ verdict of that patient who had been denied the distinction of a skia-
- ◆ graphic receipt of work done?



"OF COURSE, THE X-RAY evidence is conclusive, and theoretically should

- ◆ furnish the record of completed work, but being in business on the same
- ◆ street as Dr. Average Dentist I feel a measure of interest in the answer
- ◆ this discussion will furnish him.



"I WONDER IF DR. HARTZELL really finds a perfect root canal filling

- ◆ indicated on his every skigraph. If he does, I would be very glad to
- ◆ close my office for a few weeks and sit at his feet and be taught.



"I REMEMBER THE LECTURES we received in my freshman and junior

- ◆ years on the 'technic' of root canal fillings. Those were the happy
- ◆ days—not. I have seen numberless teeth set in a suitable holder, drilled,
- ◆ broached, explored, probed and otherwise manhandled; then filled with
- ◆ a pasty antiseptic mixture and the scene of operations marked with a
- ◆ gutta-percha skewer that was supposed to reach to the 'apical foramen'
- ◆ and for all time to 'prevent infection from infecting the alveolar process.'
- ◆ Successfully working this answer into a given place in an examination
- ◆ some months later invariably resulted in the student being accorded
- ◆ a 'rank of 100 per cent.'



"IN THOSE DAYS IT ALL sounded well. In the college clinic this pro-

- ◆ cedure was followed, because somebody originated the idea in the year
- ◆ 1845, and why change?

"SOME OF THOSE TEETH laid around my laboratory locker till cleaning-

- ❖ up time at the end of the senior year. In the meantime they had a
- ❖ chance to dry out some, likewise to shrink, and some few improved the
- ❖ opportunity and split more or less the full length of the root, and what
- ❖ do you suppose was revealed? Well, some of those roots, filled under
- ❖ expert supervision, theoretically perfect and ranked 100 per cent., were
- ❖ found to be just half filled; some were three-quarters filled and some
- ❖ were almost filled to the aforementioned apical foramen.



"IN THOSE DAYS I studied at dentistry; in these days I am studying den-

- ❖ tistry. Being an average dentist, and not having incentive to install an
- ❖ X-ray outfit, my work is not checked up after each operation.



"PERHAPS THIS IS WHY I am an average dentist. But I do feel that I

- ❖ invariably measure up the requirements of a given case and sometimes
- ❖ to a little more than the requirements.



"ONE OF THE THINGS we were never taught as budding dentists was

- ❖ what we could not do. No dentist ever has or ever will be able to
- ❖ insert a gutta-percha point, of the smallest size made, into a root canal
- ❖ one iota smaller than that point. If he thinks just a little bit he will
- ❖ discard the only alternative, enlarging, for the reason that drilling can
- ❖ only be done in a straight line, and root canals do not conform to that
- ❖ specification.



"AS MATTERS STAND, what have we to offer? The best dentistry, opera-

- ❖ tive and mechanical, is but an attempt to tinker or patch up something
- ❖ that through wear or misuse is not satisfactorily performing its function.
- ❖ Where therapeutics is involved, we are going one step beyond the purely
- ❖ mechanical requirements of the case; but at no time do we lose sight
- ❖ of the end we are working for, something mechanical and well within
- ❖ the scope of Nature's original planning. This is what we offer, it is
- ❖ what the public expects, and what the public generally gets, within the
- ❖ limits of the individual dentist performing the service. It is done in
- ❖ good faith, it is offered in good faith, and the procedure is justified by
- ❖ the fact that it has been taught, demonstrated and practiced since 1845.
- ❖ Can we in justice to ourselves now admit that for this space of time we
- ❖ have been groping in the dark, that as surgeons we have been sustained
- ❖ by faith and by faith alone? The X-ray says that our faith is a mighty
- ❖ slim support, so slim 'that we won't show our finished work to our
- ❖ patients.'



"NOW, DOCTOR, YOU HAVE STARTED something, and in justice to the

- ❖ men who are devoted to a practice within the three or five-dollar limit,
- ❖ I think you are morally bound to carry the discussion to a point where
- ❖ the finding of the discussion will square with the conscience of the
- ❖ operator who is trying the best he knows how to do the right thing,
- ❖ who cannot check up finished work, and who yet realizes the force of
- ❖ the objection raised against his unchecked work."



Around the Table

I DO NOT SEE HOW I can do better than to follow this with a communication from Dr. W. T. Jacobs, of Muskogee, Okla., who writes as follows: "I am always interested in your Around the Table talks, and after reading your long-distance talks with high authorities, I venture to offer my solution of the problem, at least as it applies to my own case. I am an unknown dentist in this far Southwest, but my experience and problems I believe cannot differ much from those of the average dentist. I am interested deeply in my dental work, making it my life study, and being so interested I naturally do all dental work, each operation, to the best of my ability, watching each mouth for good results and trying to improve each day by experience gained from previous operations done, whether amalgam filling, inlay, crown or root canal filling.



"I FIND THAT NINETY PER CENT. of new business comes through pleased patients. Therefore, from a purely business standpoint I cannot afford to not do a canal operation to the very best of my ability, that it may prove satisfactory to my patient and convert him into a friend. But most of all, there is the irresistible desire to fill that canal as nearly perfectly as human skill may fill it, that I may have the satisfaction of knowing that I have done my best, and that my best fairly averages up to the other man's best.



"LOOKING AT THE MATTER in this way, if a particular patient cannot pay a full fee, remember that your remuneration will come first from the knowledge that you have not shirked, which is the mental and moral profit; and, secondly, through others recommended to you by that satisfied patient, which is the financial and final profit.



"A TRULY PROFESSIONAL man can find no excuse within his own heart for slighting an operation, especially a money excuse. He who puts nothing into the world takes nothing out of it."



THOSE OKLAHOMA CHAPS have some good ideas, don't you think?



Dr. Faneuil D. Weisse.

Dr. Faneuil Dunkin Weisse, Dean of the New York College of Dentistry, died suddenly on Tuesday, June 22d, at his summer home in Gedney Farms. Dr. Weisse was 72 years of age.

He was born in Watertown, Mass., and was a descendant of Peter Faneuil, who donated to Boston the historical building, Faneuil Hall. Dr. Weisse was the son of Dr. John A. Weisse, philologist. His father tutored him for twelve years, giving him an education which enabled him to enter the medical college of New York University, from which he was graduated in 1864.

Dr. Weisse, who was one of the founders of the New York Dermatological Society and the American Veterinary College, began his career as a medical educator under Dr. Valentine Mott, Professor at the New York University Medical College, in 1863. Dr. Weisse became Lecturer and Clinical Professor of Dermatology at the university in 1865. From 1874 to 1875 he was Professor of Surgical Pathology, and for thirteen succeeding years he was Professor of Practical and Surgical Anatomy.

Following his graduation from college, Dr. Weisse was Professor of Surgical Pathology at the New York College of Veterinary Surgeons. For almost half a century he was Professor of Anatomy, Surgical Pathology and Oral Surgery at the New York College of Dentistry. He was chosen Dean of the College in 1897.

In 1886 Dr. Weisse completed a volume known as "Practical Human Anatomy," which was the result of seven years of labor and research.

Dr. Weisse married twice. His first wife, who was Miss Mary Elizabeth Suydam, daughter of Mr. Henry Suydam, of New York, died about seven years ago. In August, 1910, Dr. Weisse married Mrs. George H. Ripley, daughter of Mr. William Churchill, of this city.



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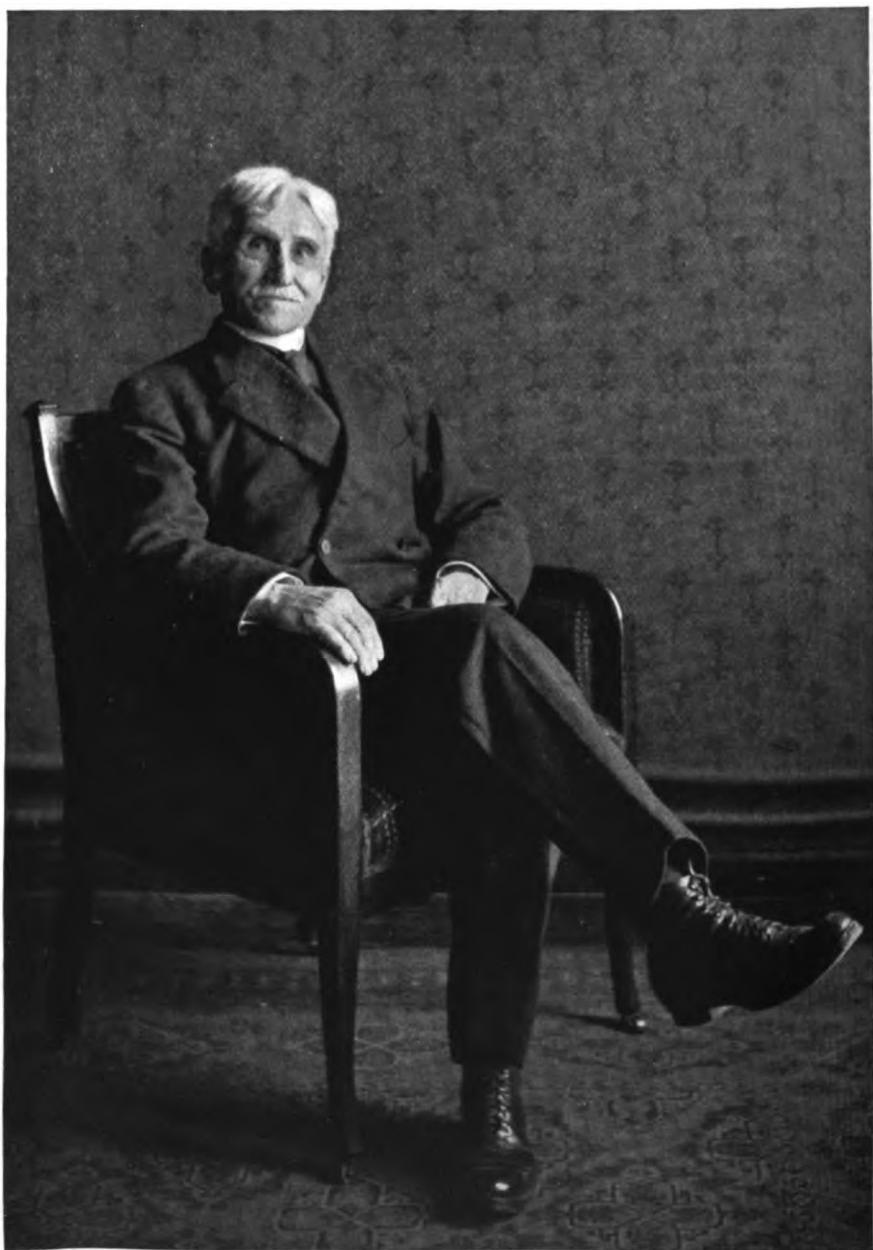
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SAMUEL SMITH NONES, D.D.S.



Local Anesthesia in Operative Dentistry.

By LEO STERN, D.D.S., Dental Clinician, Vanderbilt Clinic (Roosevelt Hospital).
(Illustrated with pen drawings made by the author.)

Although numerous papers describing the technique of conductive and infiltration anesthesia have made their appearance in the dental journals of the past year, no adequate emphasis has been laid, it seems, on the scope and applicability of this aid to dental practice. The result has been that the average practitioner has not felt sufficiently encouraged to study the principles of the procedure and make them a part of his professional equipment.

It is far from my intention to belittle the comments of other writers on the subject. Much valuable material has been presented and a great deal of enthusiasm aroused—almost enough, in fact, to make the popularity of conductive anesthesia for oral surgery assume the proportions of a fad. It would not be superfluous, however, to outline the technique of local anesthesia in a manner sufficiently simple and lucid to enable the reader to follow it in a practical way, together with an indication of its wide scope and its possibilities as applied to the routine of *daily dental practice*. The directions and explanations in this article have been given in terse language for the sake of directness, but they are sufficiently comprehensive, it is believed, to serve as a guide in studying the subject.

Local Anesthesia.

Local anesthesia, with its modern perfection of detail and technique, comes so close to being the panacea for the relief of all dental pains that it deserves the careful consideration of every progressive member of the profession.

Too little, in my estimation, has been said in regard to its applicability in alleviating the pain incident to the average dental operation. In addition to the profound anesthesia which it affords for purely surgical interferences, I have found it to be invaluable for obtaining absolute relief from pain in a surprisingly miscellaneous list of operations. These include :

1. Preparation of all types of sensitive cavities.
2. Extirpation of pulps.
3. Grinding and shaping of abutments for crown and bridgework.
4. Scaling and planing pyorrhctic roots.
5. Anesthesia of pericemental diseases, including alveolar abscess, enabling painless opening into the pulp chamber to relieve congestion.
6. Prophylaxis of inflammatory conditions (according to the method of Dr. Riethmüller), including hyperæmia of the pulp.

The formula for unqualified success in these procedures is to adopt and practice an exact technique and never to deviate from it. Such a technique it is my purpose to describe, being in all essentials that perfected by Dr. Guido Fischer, of Marbury, Germany.

Importance of Maintaining Asepsis. The foremost requisite is to observe every precaution that will maintain asepsis. It is impossible to overemphasize the fact that everything should be sterile—the hands of the operator, the mouth of the patient, the instruments used and the solution to be injected. Surgical cleanliness must be maintained. Many untoward sequelæ which have been confounded with and described as the toxic action of novocain, are traceable directly to imperfect asepsis.

The Solution. The base or dilutant of the solution must be strictly isotonic. Normal salt solution has been supplanted by the use of the Ringer base, which minimizes post-operative pains, chiefly by virtue of its calcium content, which seems to exert therapeutic effects. A formula for such a solution follows:

Sodium chlorid .....	.5 gm.
Calcium chlorid .....	.04 "
Potassium chlorid .....	.02 "
Aqua destillata	100. c.c.

Ringer tablets are now obtainable and are very convenient for making up a stock solution. The addition of these tablets to sterile distilled

water should be made in the proportion of ten tablets to 100 c.c. of water, gently heated in an *absolutely sterile* porcelain dish and kept in a dropping bottle that will protect its sterility (Fig. 1), and serve to have it always ready for use.

For obvious reasons, no more anesthetizing solution is to be made up than is necessary for immediate use. Pour 3 c.c. of Ringer solution



Fig. 1.

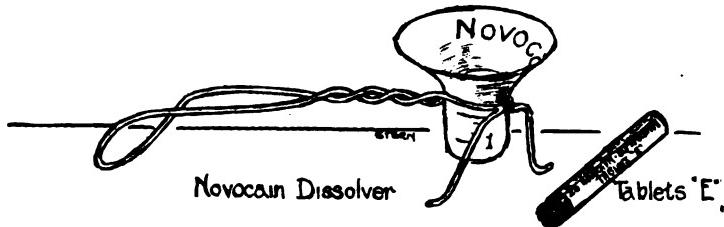


Fig. 2.

into a clean porcelain novocain dissolver (Fig. 2) and warm over an alcohol flame. Three tablets E of novocain-suprarenin (Farbwerke, Hoechst Co.) are added, and the liquid boiled; resulting in a two per cent. novocain solution. The entire dish should then be placed aside under a large brown glass cover to protect it from light and dust until the operator is ready. If any discoloration of the solution is observed it should be rejected, as this signifies staleness of the suprarenin contained, and a new solution prepared.

The best syringe to use is that designed by Dr. Fischer for the purpose (Fig. 3). It is made entirely of metal and glass and it is easily taken apart for boiling. Its capacity is forty minimis.

The Syringe and its Care.

Nothing but iridio-platinum needles should be used, of two lengths—42 mm. and 23 mm., for conductive and infiltration anesthesia respectively. Two syringes should be kept on hand, equipped with each size needle respectively.

After use, the syringes are to be cleaned by drawing into them a mixture of alcohol, three parts and glycerine one part, and should be

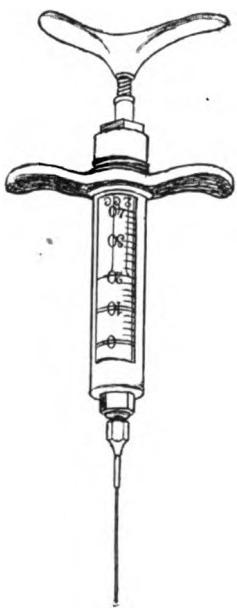


Fig. 3.

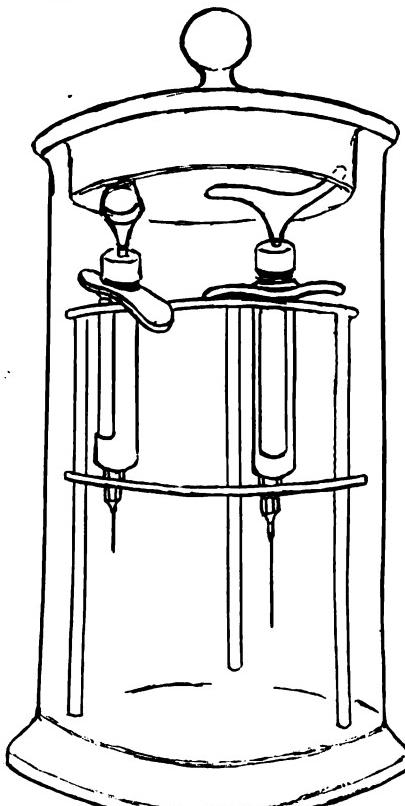


Fig. 4.

suspended in a jar of the same solution when not in use (Fig. 4). Before filling a syringe with novocain solution it should be freed of alcohol by forcing boiling *distilled* water, uncontaminated by soda or any other chemical in, and of it several times. As an added precaution the tip of the platinum needle is heated to redness in the alcohol flame, after which the syringe may be filled.

Preparatory to the injection it is of great importance to ascertain the exact condition of the mouth by examination. In cases where the patient observes proper care of the oral cavity, simply spraying with a mild an-

tiseptic solution such as peppermint water (U.S.P.) is sufficient. Where general oral unhealthiness presents, however, it is advisable first to thoroughly swab the soft tissues with hydrogen peroxide diluted to one-half strength.

Before touching the patient, the forearms, hands and finger nails of the operator should be thoroughly scrubbed with tincture of green soap, rinsed, and immersed in a 1-5000 solution of mercuric chloride for several minutes.

Many of these details may seem trifling or superfluous, but the writer has found, upon experimentation, that variation usually means partial or complete failure, both in the profundity of the anesthesia and the prevention of the post-operative pains, not to speak of the danger of infecting the patient. Each step is important and must be followed to the letter. With the use of a little intelligence in arranging conveniently the apparatus described, and after a little practical experience, the technique will become automatic. It is always simplest to learn correctly.

Before entering into a description of the technique covering the actual operation of injection, it would be well to consider briefly the anatomic structure of the parts to be anesthetized and their relationship to the location of the nerves supplying them.

The maxillæ present a characteristic cancellous structure. Examination discloses numerous perforations on both facial and lingual surfaces. These structural arrangements facilitate the penetration of the injected fluid to the nerve supply of the teeth, and it is for this reason that simple infiltration of a novocain solution is sufficient to produce anesthesia of the upper teeth.

The mandible is far more compact in structure than the maxillæ and its alveolar process is thicker. The minute perforations are absent with the exception of a few in the region of the anterior teeth. Nerve blocking is therefore a necessary procedure in anesthetizing the lower teeth.

The entire dental apparatus is enervated by the trigeminal, or fifth cranial nerve, which divides into three branches: the ophthalmic, the superior maxillary and the inferior maxillary. These branches are all sensory* and therefore transmit every painful impression of the region.

The distribution of the last-named divisions is important.

The second, or superior maxillary division, terminates in the infraorbital nerve, giving off numerous branches in its course. Of these, the superior dental nerves are of interest to us. The middle and posterior superior dental nerves supply the alveolar process and the posterior teeth.

*The inferior maxillary nerve, of course, contains motor filaments.

The infra-orbital branch emerges from the infra-orbital foramen sending off branches which supply the oral mucosa, the floor of the nose and the anterior teeth (Fig. 5).

The anterior portion of the palate is innervated by the naso-palatine nerve which emerges from the incisive or anterior palatine foramen (Fig.

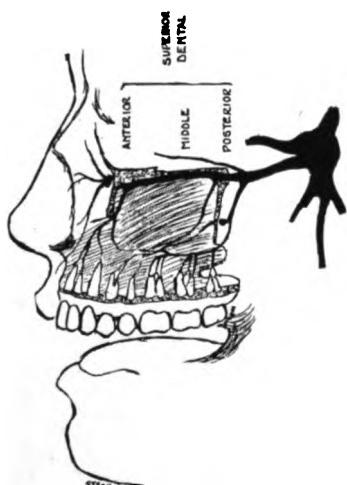


Fig. 5.

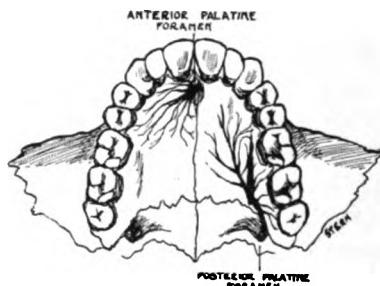


Fig. 6.

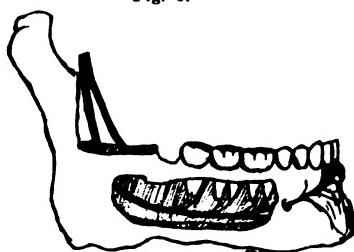


Fig. 7.

6), while the posterior portion is supplied by the anterior palatine nerve emerging from the posterior palatine foramen opposite the second molar (Fig. 6). These nerves anastomose in the bicuspid region.

Complete anesthesia of each maxilla may, then, be obtained by injecting the novocain solution in the four foramina enumerated, namely, the infra-orbital and posterior dental foramina buccally and the anterior and posterior palatine foramina lingually. These procedures block the transmission of any sensation in the upper jaws. The modus operandi of these injections will be detailed below.

The inferior maxillary division of the fifth nerve supplies the entire lower jaw (Fig. 7). Its inferior dental branch enters the mandible through the inferior dental foramen, which is situated on the inner surface of the ramus, about 1.5 cm. above the last molar. This nerve sends off a few

filaments from the mental foramen which anastamose with the nerve of the opposite side.

Lingually the tissues are likewise supplied by a large branch situated in front of the inferior dental nerve; the lingual.

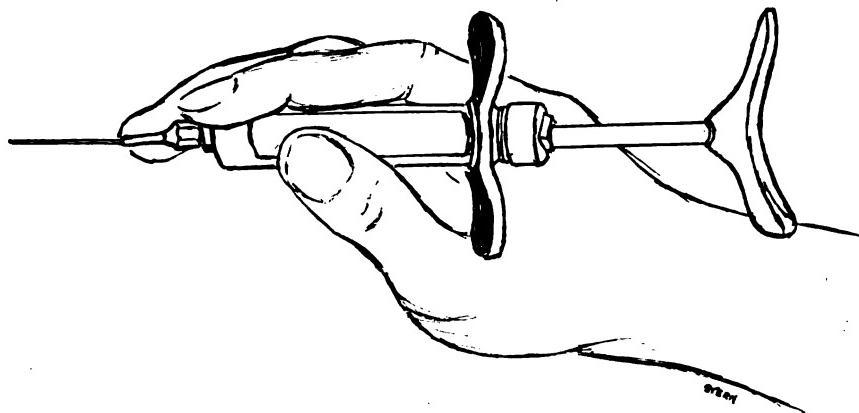


Fig. 8.

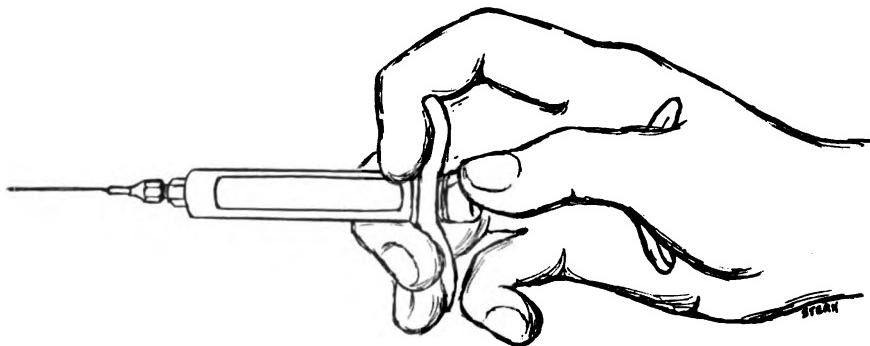


Fig. 9.

These innervations are most important, and the operator should thoroughly familiarize himself with the areas of distribution before attempting to block the nerves supplying these areas.

It is of advantage to practice holding the syringe

Syringe Grips. in the correct manner. To insure delicacy of touch and accuracy in placement it should first be grasped as one would a pen (Fig. 8). The needle should be carefully inserted and settled in the correct location without the use of any force whatsoever.

Once in place, the barrel should be steadied with the left hand while the right engages the plunger in a pistol grip (Fig. 9) and the fluid *very*

slowly injected. Delicacy of touch is the all-important qualification in securing accuracy and positive results, and should be carefully cultivated.

As previously mentioned, local anesthesia may

Methods in Local Anesthesia. be produced by either of two methods: infiltration anesthesia or conductive anesthesia.

Infiltration anesthesia is produced by forcing the novocain solution through the porous structure of bone, whence it eventually penetrates to the nerve supply of the part and thus paralyzes the sensation of a restricted area.

Conductive anesthesia is a more complicated procedure in that it involves the operation of locating the superficial point in a nerve trunk

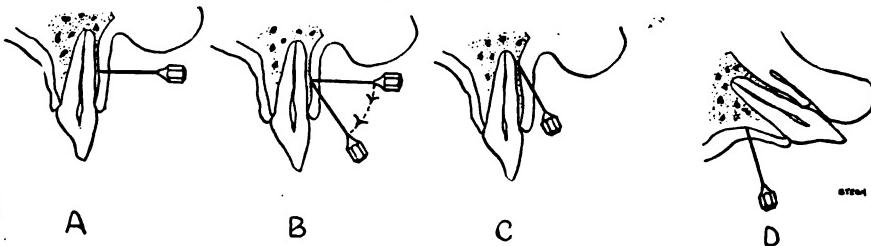


Fig. 10.

supplying a comparatively large area and passing the injecting needle into or very near it, thus, by direct action of the anesthetic at that point blocking the sensory terminations of that nerve.

Infiltration anesthesia is especially applicable to the upper teeth and to the lower anterior teeth.

Conductive anesthesia is indicated in the lower posterior teeth, in infections (abscess, pyorrhea, etc.), and where it is desirable to anesthetize a large number of teeth. Combinations of the two methods are frequently indicated.

Infiltration Anesthesia.

Because of the comparative simplicity of its technique, the infiltration method of anesthesia will be considered first.

Upper Anterior Teeth. Spray the mouth thoroughly with an antiseptic solution. Always use the left hand to draw away the cheeks and lip. Paint the area of the mucosa to

be injected liberally with the following solution, which sterilizes the point of injection, and further, serves to dull the pain of inserting the needle:

R: Tincture Aconite.

Tincture Iodine.

Alcohol, Absolute, equal parts.

This may be accomplished conveniently by the use of absorbent cot-

ton twisted over the end of a wooden applicator. Throughout the operation the left hand should remain placed. The syringe to which the short (23 mm.) needle is affixed, having been sterilized and filled, should be grasped in the first, or pen position. Heat the tip of the needle to redness.

Holding the syringe delicately, allow the needle, its orifice turned towards the bone, to pierce the tissues at right angles to the long axis of

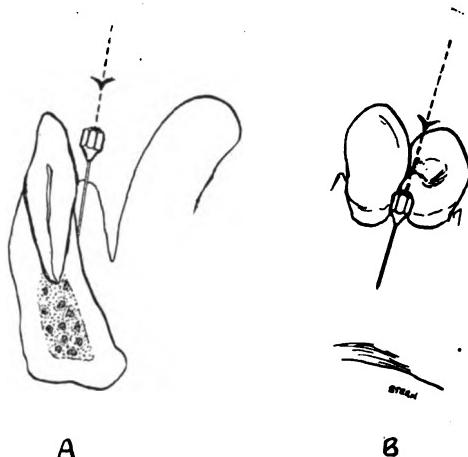


Fig. 11.

the tooth and at a point about halfway between the apex and the gingival margin of the root (Fig. 10a). Work deliberately and cautiously. As soon as the bone has been reached, change the direction of the needle until it points towards the apex of root (Fig. 10b), and then, with the application of a minimum of force, slide the needle upwards and inwards until the point is judged to be opposite the apical foramen (Fig. 10c). Change now to the pistol grip and inject $\frac{1}{8}$ of the barrel of fluid very slowly and evenly. Fully two minutes should be given to inject this quantity of solution.

Withdraw the needle carefully and massage the tissue, a procedure which aids the penetration and distribution of the anesthetic. As a control to the accuracy of the technique, if the injection has been properly made, a gradually spreading area of anaemia will be observed to radiate from the point of insertion as the fluid enters the tissues. This is caused by the action of the suprarenin on the superficial blood capillaries and indicates, to a degree, the extent of the anesthetized area.

Direct the patient to open the mouth to its full extent. Determine a spot lingually along the central axis of the tooth about one-third the



distance below the apex. Paint the area with the iodine solution, heat the point of the needle to redness and pierce the tissues to the bone at an angle of about forty-five degrees to the tooth, employing the pen grasp (Fig. 10d). Change to the pistol grip and slowly inject the fluid remaining in the barrel.

In ten minutes, the tooth may be worked upon and the anesthesia will last at least three-quarters of an hour, after which it disappears gradually.

Upper Posterior Teeth. The inclination of the needle must be changed from a right angle to an acute angle, owing to the interference of the cheek. If several adjacent teeth are to be anesthetized, the needle should be allowed to advance in a horizontal direction along the bone, injecting the fluid continuously with its penetration.

Lower Anterior Teeth. The infiltration of the lower teeth presents no marked difference in procedure. The direction of the needle, however, is changed to one just diverging from the parallel (Fig. 11a). Lingually the injection is made *between the teeth* (Fig. 11b), entering mucosa near the gingival margin and sliding the needle directly downwards.

As a conclusion to the subject of infiltration, a modification of Fischer's enumeration of points to be observed in generalized technique is given:

1. Asepsis obtained and preserved.
2. Isotonia of solution.
3. Sterilization of mucosa.
4. Quieting any nervousness on part of patient.
5. Two injections, one buccally and one lingually.
6. Orifice of sterile iridio-platinum needle pointed towards bone.
7. Slow injection with strong pressure.
8. Massage of mucosa to distribute solution.
9. Wait of ten minutes during which preparations for operating may be made.

Conductive Anesthesia.

By far and more satisfactory a method of anesthetizing the teeth from the standpoint of the operative dentist, in that it avoids all danger of injury to the pulpal tissues, lasts longer and is less painful, because the needle pierces loose tissues, is conductive anesthesia. The principle involves injection of a nerve trunk, which inhibits the function of that nerve below or peripherally to that point.

Mandibular Anesthesia.

As far as dental practice is concerned, mandibular anesthesia is the most important conductive procedure, because it is most often indicated, owing to the frequent occurrence of caries in the lower molars. It comprehends a technique which is rather difficult to master, but it compensates for this in the certainty of its effect. The end and aim of the injection is to block the inferior dental nerve by forcing novocain solution in a restricted area immediately surrounding the inferior

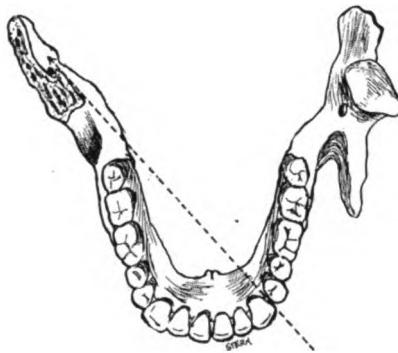


Fig. 12.

dental foramen, where the nerve in question enters the mandible to supply its peripheraries. The lingual nerve, because of its proximity to the inferior dental nerve at this point also becomes affected. Successful technique should obtain a complete anesthesia of all tissues extending posteriorly to the first lower bicuspid, as well as partial anesthesia of the anterior teeth.

A certain amount of sensation persists here because of the anastomosis of filaments emerging from the mental foramen of the other side of the jaw and penetrating beyond the median line. Complete anesthesia of the anterior teeth as well as the posterior is most satisfactorily produced by injecting into the inferior dental foramen on both sides, depriving the entire lower jaw of sensation. Paralyzing the anastomosing filaments by injection into the mental foramen of the opposite side is possible, but less certain.

A study of the shape of the body of the mandible and the angle of inclination of the rami to it should prove interesting and helpful. Because of the limited scope of this work, however, I will confine myself to a consideration of the points of identification or "landmarks" in the living subject.

Having drawn the cheek away, palpation examination of the mouth will disclose the fact that the anterior border of the ramus slants up-



wards and outwards from the alveolar process of the last molar. A short distance externally, if the finger tip is allowed to slide upwards along this anterior border, it will soon lodge in a slight depression, the retromolar fossa. In some cases this fossa is so shallow as to be almost obliterated, but it is always present, and the practised hand can always detect it. The internal margin of this fossa represents the internal border of the ramus. From this border the inclination of the ramus is decidedly outwards, so that penetration of a needle along the bone is in

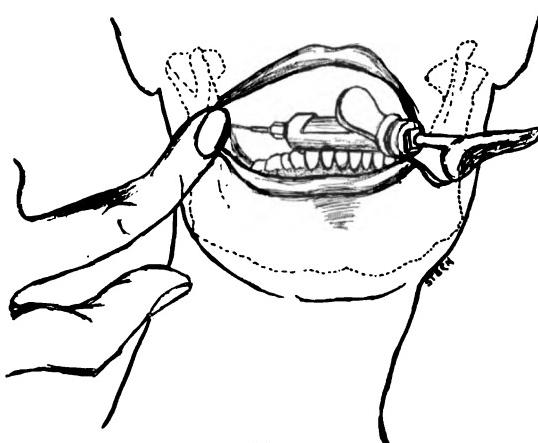


Fig. 18.

a direction which, if produced, would intersect the canine and bicuspid teeth of the opposite side (Fig. 12).

With the foregoing facts in mind, the technique of injection has been designed as follows:

Stand to the right and obliquely in front of the patient. Have the sterile syringe equipped with the long (42 mm.) needle filled and at hand. Spray the mucosa thoroughly with peppermint water. Use the left index finger to palpate for the retromolar fossa and to draw away the cheek in the same movement. Having brought the ball of the finger-tip to rest in the fossa, *keep it in place* with pressure. On no account should the index finger be moved until after the injection is over.

Paint the mucosa liberally with the iodine solution. Heat the needle-tip, grasp the syringe in the first position, and carefully insert the point of the needle into tissue as close to the center of the index finger-nail as possible, allowing the barrel of the syringe to project in a direction that will intersect the canine tooth of the other side (Fig. 13).

If any obstructions are felt, withdraw the needle somewhat (not entirely) and penetrate again in a slightly different direction. Push the

needle delicately through soft tissue until it is entirely inbedded. At this point, a probing movement should disclose the fact that the needle-point is touching bone. The length of the needle is adjusted to extend just a little beyond the foramen if the direction is correct.

Change to the pistol grip and, while moving the syringe forwards and backwards over a distance of about a centimeter, inject the entire contents of the barrel slowly. Withdraw the needle carefully and wait for the full effect of the injection.

Presently, on being questioned, the patient will admit a swollen or numb feeling in the region of the alveolar border. This sensation is best described as a feeling of "pins and needles," and is identical with the sensation experienced when one's foot or arm "falls asleep." The affected area will gradually spread anteriorly until half of the lower lip becomes partially paralyzed and the chin is devoid of sensation. An impulse to bite the lip is usually experienced. Finally the numbness will extend to the later border and under surface of the tongue, signifying that the lingual nerve has been blocked. With the presentation of these symptoms the operator may, twenty-five minutes after injection, work on any tissue posterior to the cuspid: tooth, bone or mucous membrane, in any manner he sees fit, and he will find the entire area devoid of sensation.

If the anterior teeth are to be included in the anesthesia it is the writer's practice, as remarked previously, to make the mandibular injection at both inferior dental foramina, rather than to rely on the uncertainty incident to the injection into the mental foramen.

There are four points of injection in the upper jaw. The injection at the maxillary tuberosity together with an injection into the posterior palatine foramen anesthetizes the posterior teeth and tissues; injection into the infra-orbital and anterior palatine foramina disposes of the anterior structures.

Maxillary Anesthesia. Have the apparatus arranged conveniently at hand. Spray the mucosa. Draw away the lip and cheek with the index finger of the left hand, while with the thumb, palpate the lower border of the orbit until a depression is found in a line with the upper first bicuspid. This marks the location of the infra-orbital foramen.

Anterior Injections. Paint the mucosa with iodine solution and insert the needle into the soft tissues (that is, away from the bone) at a point between the roots of the cuspid and first bicuspid. Advance the needle upwards and in-

cline it slightly backwards until it is felt beneath the thumb, which should still rest over the foramen (Fig. 14). Inject 1.5 c.c. of novocain solution, withdraw the needle and massage the area of the foramen with the finger-tip.

The anterior palatine foramen should now be injected. Direct the patient to open the mouth, paint the incisive papilla with iodine solution and pierce its center with the sterilized needle (Fig. 15). Deposit a drop of solution immediately beneath the mucosa and hold the syringe in

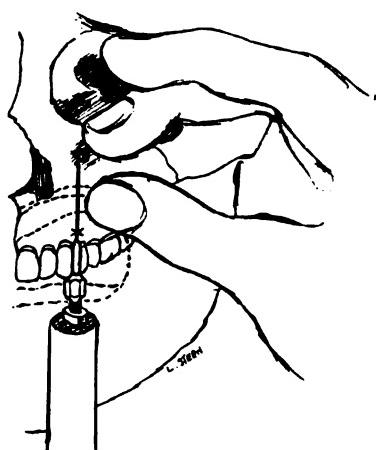


Fig. 14.

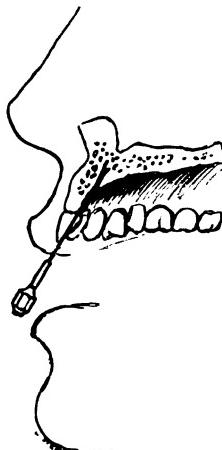


Fig. 15.

position for a full minute; the injection is rather painful unless this precaution is observed. Advance the needle slowly in a direction quite parallel to the incisor roots and inject .5 c.c. continuously with its penetration. Withdraw the needle carefully and wait.

Symptoms. The familiar numb sensation is felt almost immediately in the base and side of the nose, later in the lip, which droops noticeably. A waiting period of fully fifteen minutes is advised before work is begun.

Posterior Injections. The injection at the maxillary tuberosity is made by fixing the index finger of the left hand on the prominence of the zygomatic process, allowing the thumb to draw away the cheek. The mouth should be opened but half-way. After painting the area with iodine solution, insert the needle into the well-defined fold of mucous membrane opposite the distal root of the first molar, a distance away from the bone. Allow it to advance upwards and backwards (Fig. 16) holding the barrel of

the syringe outwards, but allowing the needle to slide along the bone. Inject 2 c. c. of solution while moving the syringe inwards and outwards. Withdraw the needle and compress the area of injection with the finger-tip.

The posterior palatine foramen is marked by a depression in the palatal mucosa opposite the lingual root of the last molar. Heat the needle, and after sterilizing the mucosa, insert the needle opposite the lingual root of the second molar and at a point 1 cm. distant (palatally)

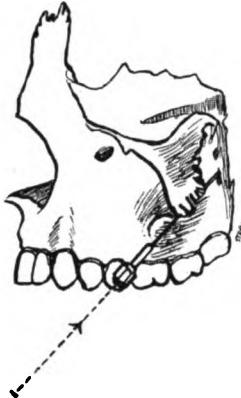


Fig. 16.

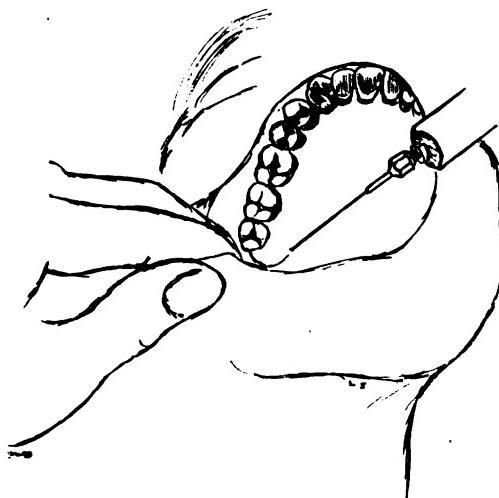


Fig. 17.

from its apex (Fig. 17). Press upwards, backwards and outwards until the needle has been buried and slowly inject .5 c. c.

Symptoms. There will be a swollen and numb sensation of the process, and to some extent of the cheek and palate. Operate in fifteen minutes.

Conductive anesthesia, although more difficult in technique is the method to be preferred by the operative dentist.

Comments on Conductive Anesthesia. Infiltration anesthesia seems to involve a slight danger to the pulp, as may be observed in the following cases recorded, all injected for the purpose of preparing cavities where the dentin was highly sensitive. Most of these cavities were superficial.

Method	Number of Cases	Hyperæmia	Death of Pulp
Infiltration	86	9	2
Conductive	193	None	None
655			Sept.

To the contrary, among these cases of conductive anesthesia there were numerous instances of relief and cure of pulpitis due to hyperæmia after the novocain had been injected.

It is my practice after preparing a cavity in this manner to dry it thoroughly and place in a pledget of cotton moistened with pure phenol for two or three minutes, wash it out with alcohol and insert the filling immediately. Many of these, including inlays, amalgam, cement and foil fillings were made over six months ago, and presented no trouble to the patient whatsoever with the exceptions mentioned above (using the infiltration method). Unfortunately I have no data as to the condition of those pulps prior to injection.

All in all, in over 400 cases of conductive anesthesia administered for aiding some procedure in operative dentistry, not one case of hyperæmia or death of pulp developed.

As a precautionary measure it is advisable always to administer analgesic drugs locally to counteract any pain (which comes about normally) after the anesthetic wears off.

For this reason the writer recommends: After extirpation of pulp—apply campho-phenique in the root canals and seal with a dressing of cotton moistened in copal varnish. After scaling or after grinding vital abutments—burnish zinc chloride into the dried surface of dentin or cementum. After extraction or surgical procedure—either euroform paste, or in extensive cases, tamponing with pure novocain powder. Also, as described above, after preparing a cavity, allow either phenol or creosote to penetrate the dentinal tubuli to some distance.

**Post-Operative
Pains.**

Post-operative pains are best eliminated by a strict adherence to the technique described. Isotonia of the injecting solution is an important point to emphasize in this relation. Likewise the precautions mentioned in the paragraphs immediately preceding. Pain at the point of injection is sometimes a little troublesome, but this may be avoided by massaging the site of the puncture with euroform paste (Buckley), immediately following the injection.

**Dangers of
Local Anesthesia.** There is but one danger that presents in local anesthesia with novocain and that is the risk of infection. At the expense of repetition I desire to emphasize again the importance of blocking every avenue of danger from infection by obtaining and maintaining the most rigid asepsis. Another source of infection is the infiltration of abscessed areas. When in doubt as to whether this course will spread the infection, always resort to conductive anesthesia.

There is little danger of drug poisoning as rather large doses of novocain are borne without harmful effects. Frequently I have had occasion to inject 10—15 c. c. of a two per cent. solution of novocain without the patient experiencing inconvenience. In fact in no case have I observed a toxic effect of novocain.

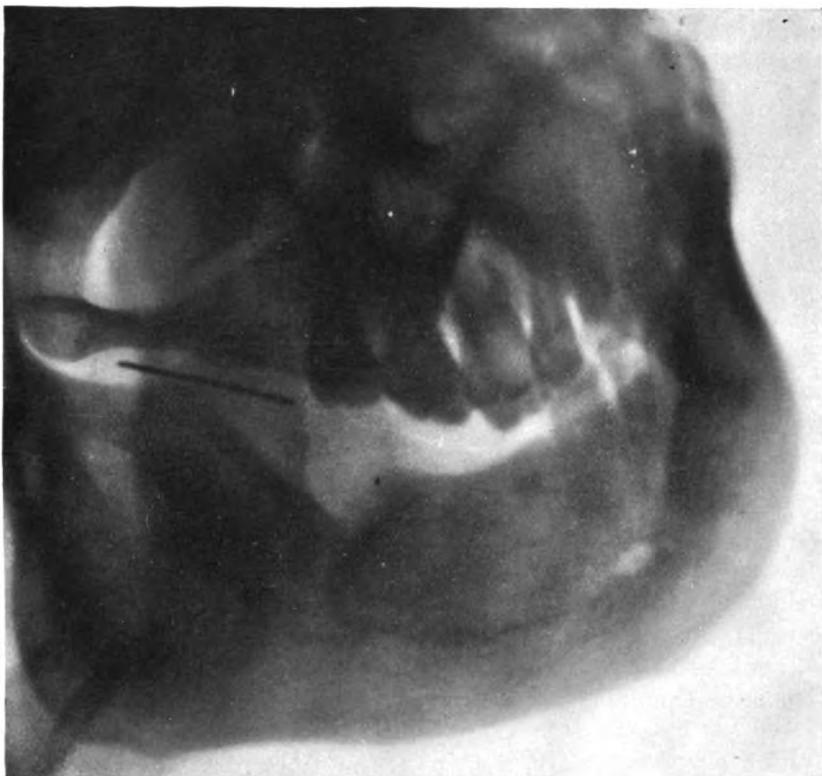


Fig. 18.

It will be found that the average patient dreads **Nervousness.** the insertion of the needle because pain is anticipated. Provided the operator is skilled in the technique of injection, there will be little actual pain associated with the insertion; merely a dull, pressing sensation as the needle travels. It is necessary to inspire the patient with confidence in the method and in the operator.

Still, there is a certain amount of psychic shock which presents in nervous patients, and that may be alleviated. A minute or two before the injection is to be made, 6 or 7 minims of validol (Farbwerke, Hoechst

Co.) may be given in a glass of cold water. Where the operation is to be extensive or severe, shock to the central nervous system may be prevented by advising a dose of bromural a half hour before the appointment.

**Accidents
through Careless
Manipulation.**

Patient aged 38. Referred to Vanderbilt Clinic from private practice.

The case pictured in the radiograph (Fig. 18) is illustrative of the unfortunate sequellæ attending careless manipulation and technique in the practice of local anesthesia.

Two days before the patient presented himself, a hurried mandibular injection had been given and the needle (42 mm.) became broken at the hub, imbedding itself deeply into the soft tissues.

Examination disclosed a locked-jaw condition, due to inflammation of the pterygoid muscles through the irritation of a foreign body.

An injection of 2 c.c. of novocain relieved the trismus sufficiently to enable an exploratory incision to be made, but it became impossible to locate the needle on account of the patient's refusal of co-operation.

Too much emphasis cannot be placed on the necessity for extreme care in technique in so delicate a procedure as conductive anesthesia.

In closing, let me emphasize that although this article pretends to be a guide in local anesthesia to the practitioner, it can at best only supplement practical demonstrations and experience. Caution must be observed in introducing the method, as the operations involved are of a very delicate nature. The use of conductive anesthesia in the past has produced remarkable results which justify its use as the most positive method for rendering dental operations painless.



An Accident with Conductive Anesthesia.

By A. BERGER, D.D.S., New York City.

Now, when there is a widespread and more or less genuine interest evinced by the profession toward "conductive anesthesia," the report of the following case which was referred to me may be rather timely and interesting.

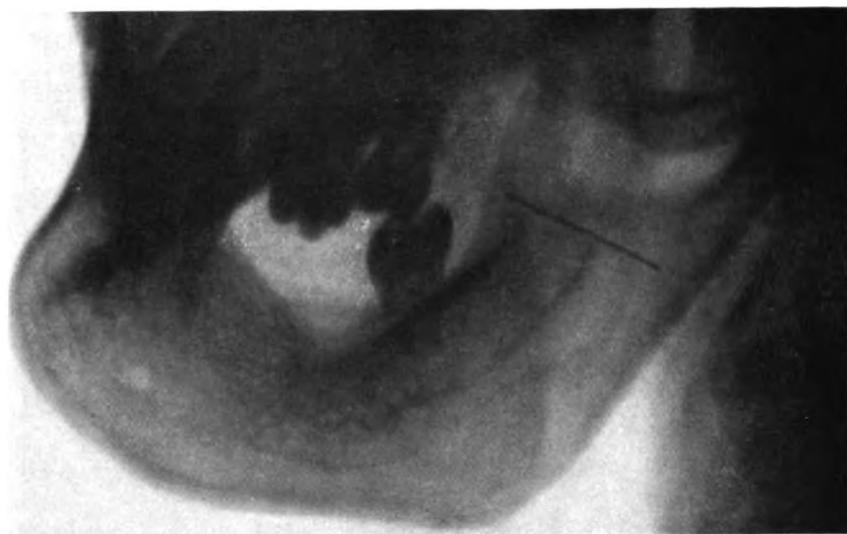


Fig. 1.

Although the books which treat on conductive anesthesia do speak of the possibility of accidents of this kind, yet I do not know of a case having been reported and illustrated in a similar manner by means of a radiograph. My object in reporting this case is merely to caution the members of the profession against one of the unpleasantest possible accidents accompanying conductive anesthesia, and not to deter them from adopting and practicing a method which is unique and excellent.

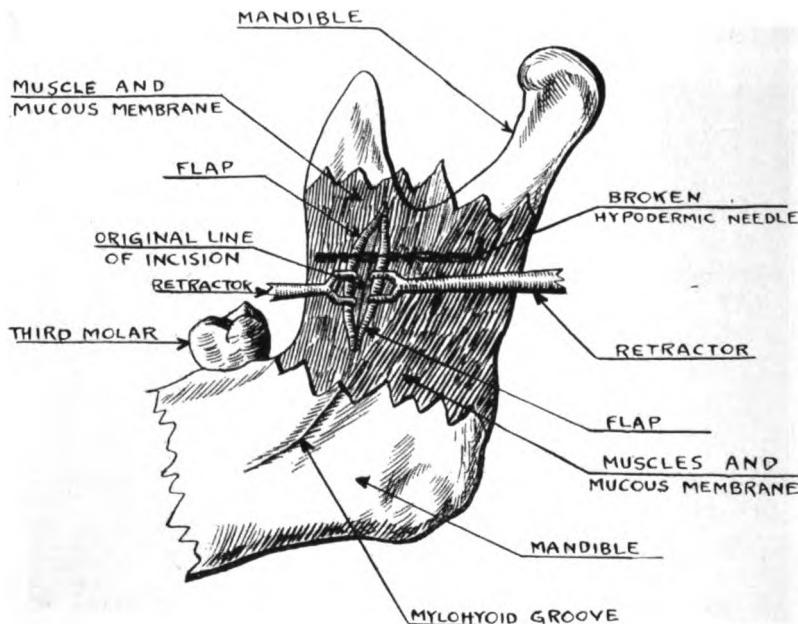
The accompanying radiograph (Fig. 1) shows a steel needle which was broken and lost in the tissues overlying the inner surface of the ramus of the mandible in an attempt to inject the inferior maxillary nerve.

In the radiograph it appears as though the needle were placed rather superficially, and that its removal could be accomplished with facility. Owing to the numerous structures in this area, the operation is a rather

exacting and delicate one, and was accomplished in the following manner:

The accompanying radiograph shows the broken needle, and the diagram (Fig. 2) illustrates the method employed in its removal.

A vertical incision from above downward about one inch long was made three-eighths of an inch behind the anterior border of the ramus. After the mucous membrane was incised, the facial and some of the



INNER SIDE OF LOWER JAW

Fig. 2.

muscle tissues were cut through. With the same direction the depth of the incision was increased until the needle was felt under the blade of the scalpel. The incised tissues were gently pushed aside and the needle firmly grasped and withdrawn with a pair of haemostatic forceps.

There are several vital points in this case which should impress those members of the profession who advocate and practice conductive anesthesia.

- 1st—Iridio-platinum needles are preferable to steel ones.
- 2d—if using steel needles, do not use rusty or defective ones.
- 3d—Do not try to force the needle through the bone, but overcome the resistance offered, either by displacing the needle by the proper manipulation of the finger or by changing the direction of the needle.



The Relation of the Internal Secretory Organs to Malocclusion, Facial Deformity and Dental Disease.*

By CLARENCE J. GRIEVES, D.D.S., Baltimore, Md.

Read before The American Society of Orthodontists, Toronto, Canada, July, 2-3, 1914

In presenting this paper the writer desires first to admit his limitations and to make an explanation, if not an apology, for so much has been claimed which cannot be substantiated on the question of the endocrine or ductless glands and their presumed function, that real physiologists are apt to look askance at the man who mentions their relation to any etiology, and his reputation as a therapist is at stake, if he even suggests organo-therapy.

Much of this distrust is well founded in the past experience of those who have been misled by the wildest flights of the so-called, but spurious, "scientific imagination"; real scientific imagery, says a recent review, "(1) whether we call it by that name, or designate it as a tentative hypothesis or a working plan, is the incentive that spurs to the highest scientific effort." Professor D. Fraser Harris (2) of the Dalhousie University has brought together in print some instances in which an idea first represented by a metaphorical expression has in time become clothed into reality; oxygen was merely a principle to Lavoisier in 1777, and when a century later it was produced in liquefied form "the metaphor had become an actuality." In physiologic chemistry, the synthesis of the active principle of the suprarenal glands represents "the crystallization of a notion; the thing of the mind has become the thing of the

*This paper, to which additions have been made, was read before The Academy of Stomatology, Philadelphia, Pa., May 26, 1914.

laboratory; the thought has been captured and bottled." "Thus it is sometimes given to the man of science," again says Harris, "to touch, to taste, to handle what was once only a notion, a suggestion, a forecast, either in his own day or that of a less fortunate predecessor." "The fabric of medical progress, indeed, of all progress is woven from legitimate dreams to a greater extent than the practical man is wont to realize or willing to admit."

In the light of this pronouncement, in spite of the fact that we have been at times awed and hushed by the statement that the dentist should

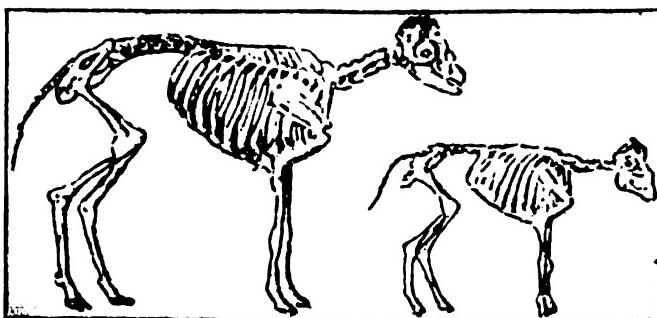


Fig. 1.

better stick to the filling of the teeth, as the shoemaker was one time told to stick to his last; we still believe that any science is our science if it be ever so remotely involved in our work, and an effort will be made to assemble certain of these facts from widely variant sources into a working hypothesis. Not one item is here submitted but what has been proven by at least three investigators, either in the laboratory, the clinic or by organo-therapy; even so, there remain sad gaps in this, as in every new theory, which have to be bridged by probabilities, all of which will be noted; there will be much error, no doubt, but if one little strand of truth can be made to correlate into a real etiology, where hitherto, in these conditions, we have been doubtful it will be beyond the hopes of the writer.

We will attempt to show that at least three of
First. the internal secretory organs are necessary to
the maintenance of life and nearly all of them
preside, each in its own way over bodily growth, nutrition and
metabolism of proteids, sugars, starches, and fats; that they
are of particular interest to us in relation to the connective tissue
group, from mucoid tissue to bone and dentin, including the epithelial
product, enamel; that they control alkaline store houses in the bones, in-

cluding waste and repair of the same, particularly of calcium and sodium salts; that there is an intimate connection between these organs and the sympathetic nervous system in all its nutritive processes. As Starling (3) has explained, this means of tissue communication through a chemical or hormone, discharged into the blood stream, is the primitive method

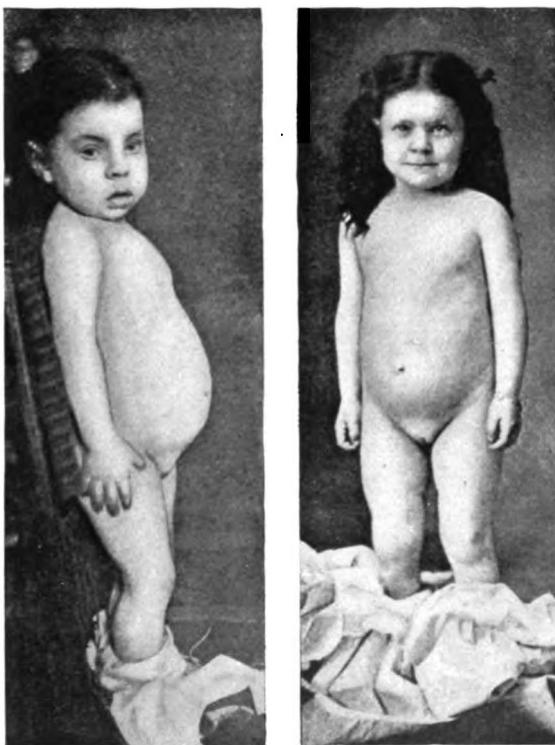


Fig. 2.

before the formation of a nervous system, and it is the only method active now in the lower life forms; but greater specialization called into being, first the sympathetic, and later the central nervous system, for more rapid communication; nevertheless this primitive form of chemical stimuli has been retained in its inter-relation with all the group and in partial control of the great nervous systems.

That all of these tissues and glands co-operate
Second. with or compensate and inhibit each other in cycle,

so that any interfering influence or disease which
disturbs this co-ordination, seriously and very diversely, affects nutrition, bodily development and function according to the time at which it

occurs, before or after puberty, with the most marked effect at the periods of bodily stress and change, *i. e.*, from birth to tooth eruption; the first and second dentitions; puberty and menstruation; pregnancy and lactation in the female; the climacteric and senility in both sexes; that the internal secretory organs have each a special function in these important periods besides that of growth, presiding over parturition; controlling sex and sex characteristics; promoting lactation and main-



Fig. 3.

taining immunity to infectious diseases in the infant, and all of this cycle is peculiarly susceptible to damage from the infectious diseases of childhood, as scarlet fever, measles, chicken-pox, whooping cough, etc.

Third. That normal development of the bones of the face and the base of the skull; the proper growth and articulation of these with the base of the skull;

the growth of the nasal and post-nasal regions and accessory sinuses and the eruption of the teeth, all depend upon the correct functioning of these organs in their correlation with the sympathetic nervous system. Insufficiency or disease in any one, will interfere with the synchronism of the whole, causing various forms of deformity; as in the major expression, for instance, thyroid disease producing cretinism and myxedema, and pituitary disease producing acromegaly and giantism, all affecting facial regions; as in the minor expression, glandular insufficiency producing the different forms of malocclusion and defects in the teeth and their eruption. That the "stress of dentition" both temporary and permanent, together with all of its attendant serious reflex neuroses, is

produced by such glandular insufficiency and trophic disturbance, interfering with the necessary synchronism of bone development. That tooth formation and the development of the dental follicle after birth, possibly before; the enamel organ and dentin germ and their fixed products, enamel and dentin, and the other dental tissues, which may be repaired, dental pulp, cementum, peridental membrane and alveolar walls are controlled by this cycle, defective functioning of the same being



Fig. 4.

illustrated in a highly cancellous alveolus and root resorption: enamel hypoplasias and opaque spots; microscopic defects in enamel rods, which often symmetrically occur in all four of a group of teeth, the first molar, for instance (being subject to early caries, which Waller mentions), and interglobular dentin areas, etc., etc. That, at least, a part of the etiology of dental caries may be explained by the function of these glands in sugar metabolism as shown by Kirk (4) and many other obscure conditions of the mouth and saliva (witness the unexplained relation of the testes and pancreas to salivary glands) all associated with the wasting of the tooth surfaces, may be accounted for by defective calcium and sodium metabolism and excessive waste of body salts, and all these are in a way under this glandular control.

Four. That there is an increasing percentage of malocclusion observed in both dentures, particularly the temporary; the premaxilæ and the maxillæ frequently fail to develop downward and forward normally; and the palatal processes of the maxilla do not develop antero-laterally to the norm, with the result that the first maxillary molars, instead of always being in correct position as claimed, are nearly always in lingual relation, ac-

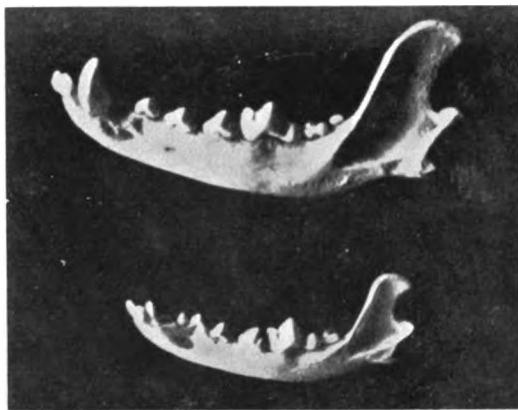


Fig. 5.

cording to Bonwill's rule; and who can say just what normal occlusion is, in the temporary denture, as related to facial angles? That this narrow and too distal eruption of teeth locks the whole occlusion and face in distal relation, particularly if the mandible appear to pass mesially as in Class 3, as noted in the frequent mandibular prognathism of cretins, preventing the downward and forward growth of the accessory sinuses; possibly preventing pneumatization and drainage of these sinuses; that early glandular insufficiency may affect the development of the base of the skull and sella turcica, disturbing pituitary function; that defective premaxillary development often deflects the nasal septum and all of these produce dental impaction and the "stress of dentition."

Fif. That hypertrophy of the pharyngeal, and faucial tonsils is common to so many children with normal temporary arches as to constitute primarily not the cause, though after it persists, it may be, of malocclusion and defective facial development, but is coincident with both and is, we believe, produced by the same defective internal secretory influences (34) in their control, or the lack of it, over the thymus and lymphoid tissue (35).



which caused the malocclusion; that the percentage of children suffering from malocclusion, adenoids and hypertrophic faucial tonsils is identical: and that hypertrophied tonsils are not necessarily infected, which is secondary, due to hyperplastic conditions.

That the part played by the gradual evolution in
Sixth. maldevelopment of the face, caused by a lack of use and civilized food habits is recognized, but we hope to show that the most important time for study of defects in facial and post-nasal growth is the period from birth until the eruption of the tem-

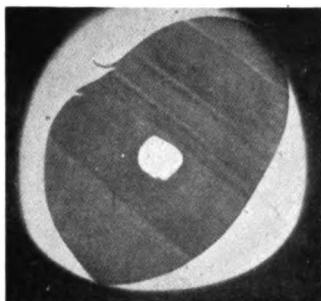


Fig. 6a.

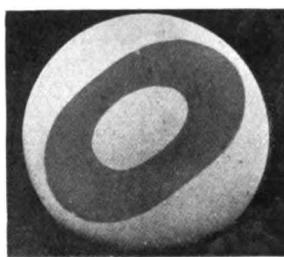


Fig. 6b.

porary teeth, where use, save that of function by heredity, could have no effect; that the neglect of breast feeding when correctly augmented later by cow's milk and solids is an important factor; that exclusive bottle feeding deprives the child of certain activators common to healthy mother's milk, which are intended to start the entire internal secretory system to early function, of which growth of bones and teeth is a part, at a time when it is needed most. That the internal secretory organs of bottle-fed babies, on the contrary have to await this process of growth, and that they arrive finally to function, but too late, after mischief is done by delay in this early period. And it can be shown with certain exceptions, such as rachitis, the etiology of which is not clear, that herein lies the cause of the failure to develop, or of development in the wrong direction of the face, teeth and sinuses and the coincident enlargement of pharyngeal tonsils, for the percentage of children with adenoids, enlarged faucial tonsils, and malocclusion are the same as for bottle feeding or defective breast feeding; and bottle feeding has long been clinically associated with these deformities.

That organo-therapy, when intelligently and
Seventh. conservatively exhibited, *is said to have done much to correct these facial defects in cretinism and in-*

fantile myxedema, without the help of the orthodontist; its use by the co-operation of the specialist of internal medicine, supplemented by calcium and phosphorus feeding is suggested in a selected number of cases for study, while the orthodontist applies mechanical measures. That enough data on the rapid widening of the maxillary arch is in hand, no matter what the method nor what the discussion of effect on the palate, sinuses or sella turcica to prove that there has been rapid nutritional improvement of the child, out of all proportion to the effects we might



Fig. 7a.



Fig. 7b.

expect from sinus pneumatization and drainage; these cases must be studied in connection with all specialists interested, as they suggest stimulation of the pituitary and neighborhood tissues to growth and function. Finally, that while bone development is assisted by modern orthodontic methods and by correct relation and use, it frequently is not maintained, nor are the teeth permanently retained, without proper function of these internal secretory organs presiding over bone growth and calcium metabolism; and, this may explain the failure of good retention and the necessary repetition of orthodontic procedure, which no doubt might be avoided by intelligent supplemental organo-therapy.

That all statements relative to the internal sec-

Eighth. retory organs are to be accepted with the greatest caution; a "Scotch verdict" is much safer than blind acquiescence, particularly as applied to our work; and so great are the dangers of organo-therapy, that no dentist should attempt it without the internist to watch all body symptoms. On the other hand all observations on mouth conditions reported by physiologists as improved by organo-therapy must first be confirmed by orthodontists and dentists who are more familiar with normal occlusion, for many cases, as Class 2, have returned to what only appeared to be normal by such simple expedients as the adenoid operation, etc., etc. That the part which varia-

tion and heredity play in the formation and eruption of the teeth and development of the face, must never for a moment be forgotten in the study of these conditions. One of the principle objects of this paper is to emphasize the pathological as compared to what might be called normal variation produced by deficient internal secretion (we might add that this is the daily problem of all those who study and treat disease), and to suggest to you Hasting Gilford's (3) theory that insufficiency of this whole internal secretory cycle may also be inherited and run through a family or race leaving its facial imprint.



Fig. 8.

The following quotation from a recent paper by Tandler (32) defines the writer's idea exactly. He says: "While fully appreciating the overwhelming results which have been attained in orthodontia within the last few years, we cannot but admit that the theoretical basis for the facts which have been practically confirmed, is yet in many cases deficient. As in many other fields of medical science, therapeutic success has here anticipated the scientific argumentation. Our want of theoretic knowledge relates particularly to two points, viz: (1) To the knowledge of the etiological factors causing malocclusion; (2) To the knowledge of that formal transformation of the skeleton which we are enabled to obtain by therapy.

"As to the first point, we have not yet advanced beyond the realm of vague supposition. Regardless of the fact that only a single reason would be given in supposing mouth-breathing to be an etiological factor in certain types of malocclusion, it should be taken into consideration that mouth-breathing itself again must depend upon certain etiological fac-

Items of Interest

tors. Though we know that mouth-breathing originates by organic changes which obstruct the nasal respiration in some way or other, we need not infer, of course, that these organic changes must be of merely local nature, and do not rather represent partial symptoms of some general constitutional quality. Only exact researches into the constitutional idiosyncrasies of persons with malocclusion can elucidate this question.

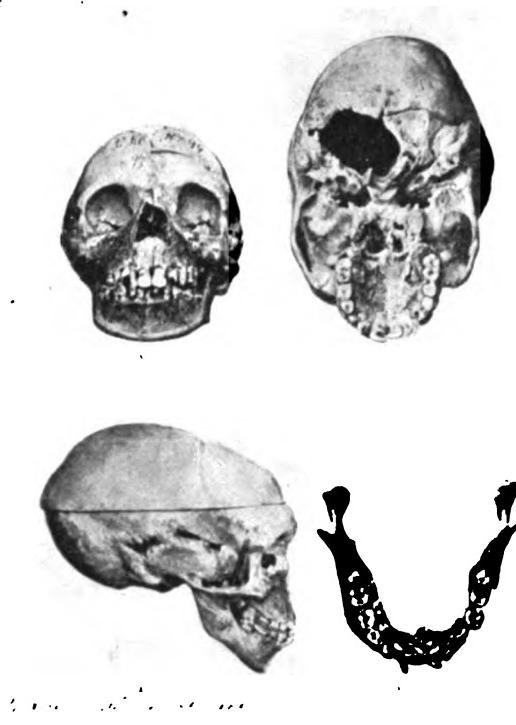


Fig. 9.

"We may mention here the high palate and narrow jaw in degenerated families, where it can hardly be assumed that we have always to deal with mouth-breathers, also the deformities of the jaw in thyrogenic constitutional anomalies, such as are to be found, for example, in endemic cretinism. In these cases we have to deal with people who, although having absolutely flat palates (Fig. 9), prove to be pronounced mouth-breathers.

"However, not only constitutional factors, but likewise congenital diseases, such as hereditary syphilis, are responsible for the shape of the cranium and the jaws. Therefore it is open to doubt whether this

determination of shape is a direct or an indirect one; whether the syphilis acquired in utero itself modifies the jaws, or causes the modification only by producing changes at the base of the cranium, especially at the sutures and synchondroses. The general diseases contracted in early youth, as, for instance, rachitis, should be considered from a similar point of view. The rachitic changes of the cranium and the facial bones without doubt determine the shape of the jaws and consequently the occlusion. How important are the general points of view regarding



Fig. 10.



Fig. 11.

particular organic changes, and including therefore anomalies of the jaws, may be deduced from the vast modifications which the jaws undergo when the normal function of some of the ductless glands is disturbed. We need only to mention here the abnormal function of the pituitary body in acromegaly, which is accompanied by an extraordinary growth of the jaws and separation of the teeth (Figs. 7 and 8). This fact is all the more important since the extirpation of the pituitary body is followed by a diminution of the jaws and consequent recovery from malocclusion. Here, certainly, it would not be correct to speak of mere local conditions.

"Here may also be ranged the changes at the base of the cranium and in the facial bones found in individuals with thyrogenic processes. If the dentition, in its later development, really represents the expression of the normal function of the glands with internal secretion (ductless glands), then, by the disturbance of these functions, changes in the

dentition must be caused, accompanied, of course, by disorders in the development of the jaws and by malocclusion."

Recognizing the defects in any attempt at classification for study of the internal secretory organs, they may for our purpose be divided into two groups: the major, because of its vital importance, consisting of the thyroids and para-thyroids, the pituitary body and the thymus; the minor made up of the suprarenals and chromaffin system as associated with the great sympathetic and trophic processes, the sexual glands, testes in the male and corpus luteum of the ovary and mammary glands in the



Fig. 12.

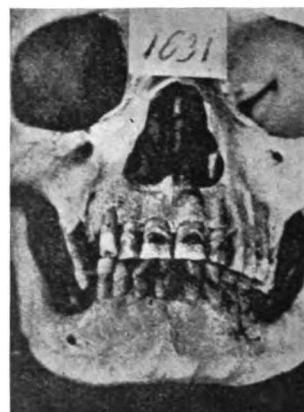


Fig. 13.

female, all of which, except the mammary, whatever their other secretory function, furnish an internal secretion or hormone. Finally, the pharyngeal and faacial tonsils, not secretory organs, but involved in this consideration as a part of the post pharyngeal lymphoid area, closely concerned with phagocytosis and clearly related in the lymphoid cycle to the thymus. These tissues are so often changed normally, in all of the stress periods mentioned, that histologists disagree as to just what the normal really is and the statements proceeding from animal experiment, clinical experience and organo-therapy are equally contradictory. However, an effort will be made to condense these findings, in the time permitted.

Osborne (5) says: "The physiologic activities

The Thyroid. which the normal thyroid is expected to furnish may be summed up as follows: It is a necessary stimulant to growth in childhood both bodily and mentally; it takes an active part in the deposition and distribution of fat and in nitrogen metabolism; it is an active opponent of nitrogen poisoning; without its activity proper genital development is impossible and secretions of the genital organs are imperfect. It takes an active part in the function of menstruation

and in development of the fetus in pregnancy; during such periods it furnishes an extra amount of secretion. If it does not do so, the menstrual function is imperfect, the woman during pregnancy is abnormal and parturition is likely to develop eclampsia and the child be born a cretin."

Cretinism. Cretinism is a mark of thyroid insufficiency in the child as is myxedema in the adult; Goiter and Graves disease indicate hypersecretion of the gland; hence it frequently becomes exhausted and insufficient in these conditions, and the goitrous mother finally produces a cretinous child. All authorities agree that, in the cretin (Fig. 1), early bone growth is delayed, there is premature cessation of development of the base of the skull (Figs. 9, 10, 11, 12), and of the root of the nose, which is broad and flattened (Fig. 2), the lips are coarse, tongue enlarged, skin yellow and leathery and hair is scanty. Biedl (6) emphasizes the fact that puberty is retarded, endochondronal ossification is incomplete, many epiphysis remain unclosed, and Schoneman (10) furnishes ample radiographic proofs of degeneration of the hypophysis cerebri incretins. "The (3) cretin of twenty-five years of age is stunted (Fig. 3), pot-bellied and ugly, with the intelligence of a child four or five years." Waller (7) emphasizes the fact that there may be many phases of these facial defects leading up to actual cretinism (a partial cretinism without the mental deficiency), due to a small thyroid insufficiency in the child, just as there may be phases of childhood myxedema, and Biedl is especially interesting when he sums up the whole matter thus: "The (6) clinical picture presented by thyroidless children is very suggestive of that of cretinism." We would especially accent the similarity of the facial defects of real cretinism to the worst cases presenting for orthodontic treatment (Figs. 2 and 3), and that these defective arches, particularly maxillary (as in Class 2), malocclusion generally associated with enlarged tongue and mandible and adenoids have all been corrected, according to many authorities, by feeding the child thyroid extract. *This is a practice needing immediate and most careful investigation by orthodontists.* We would emphasize the statement made by Ott (8) in which all authorities again concur "that a proper amount of thyroid secretion is of especial importance in the early extra-uterine life," one of the periods named in the synopsis, when so many developmental processes are happening to teeth, sinuses and face, many of which, if they go wrong, cannot be repaired, such as enamel defects, hypoplasias, etc. (Fig. 13).

It is equally important that we thoroughly understand the assertion made frequently, that "Suppression (6) of the thyroid is followed by a decreased irritability of the sympathetic nerve and this in turn is manifested in a sluggish circulation and in certain trophic disturbances," be-

cause trophic processes are those involved, so far as we know in bone and tooth-root absorption and rebuilding; (Fig. 9) tooth eruption and formation, and possibly accessory sinus formation. If these processes are not normally timed, there is "stress of dentition" caused by delay and impaction, frequently resulting in malocclusion, which in turn aggravates these neuroses of faulty dentition. "This (5) gland has some control not yet clearly understood over the central nervous system and the blood and its products," but most important to us as dentists, is its relation to the nutrition of the great connective tissue group (Fig. 4), both in the child and adult, illustrated in myxedema, "which occurs in women to the total of eighty per cent. and may be readily passed on to the child."

Myxedema is the adult expression of hypothyroidism,

Myxedema. producing atrophy of the genitals, ovaries and testes, blunting mental activity, slowing speech and cerebration, reducing proteid metabolism and the amounts of phosphoric acid and carbonic acid excreted, producing hyperplasia of the connective tissues, which Starling and others describe "as a real interstitial growth of these tissues," enlarging the face and tongue, and this may also exist in minor degree during childhood (Figs. 2 and 3) and adolescence and is also claimed to be relieved, by thyroid feeding. It is very suggestive that this hyperplastic condition can occur in children, and it may account for enlargement and protrusive development (Figs. 10 and 11), and the failure to contract and turn downward of the premaxillæ, as shown in the study of these bones by Mosher (18), which, after the defect occurs, become ossified into various phases of Class 2. If true, this will indeed explain much hyper-development of these areas.

Hyperthyroidism produces Goiter in endemic and

Hyperthyroidism. other forms including Graves' disease, and is the exact obverse of myxedema and cretinism; over-function often leads to the compensatory enlargement of the gland and frequently thyroid insufficiency in both mother and child. So endemic cretinism in children and animals (Fig. 1), depending apparently on drinking water, is quite common in goitrous districts, one of which "in France in 1873 (6) totalled 120,000 cretins." Biedl's remark, "That thyroid insufficiency does not present cretinous or myxedematous symptoms in the child early or at birth, but that they develop later because the mother's organism sufficiently supplies the fetus with thyroid for the early extra-uterin period," is interesting when read, in the light of the statement, by many physiologists, "That (6) the thyroid presides over lactation, supplying its secretion through mother's milk to the child, and, to prove this, he quotes Spolvarine's studies of myxedema (9) in several sucklings nursed by strumous or hypothyretic mothers or nurses, "whose



milk," as he says, "did not contain the thyroid substance in sufficient quantity" to activate the child's internal secretory organs..

The parathyroid bodies, always existing as two or more, are associated with the thyroid, the loss of all of which produces death, usually by tetany, are particularly active in calcium metabolism. Erdheim

has produced resorption and softening of bone, dentin, and enamel in rats by partial parathyroid removal; it is to be noted that these were rodents with persistent pulps and enamel organs where such resorption is histologically possible by way of the blood stream, and it is to be regretted that there is no record of such experiments on the teeth of mammals, without the persistent pulp. Since this was written the wonderful work of Pefer Krantz shows the same results on dogs, pigs and sheep, with changes in size and shape (Figs. 5 and 6) of the dentin and enamel organs, all of which were produced by interference with the endocrine organs and then often corrected by organo-therapy or implantation. (Deutsche Zahnheilkunde in Vortagers, 1914.) A study of the salivary changes would also be most instructive in this connection. "Tetany (8) can ensue in lactation, in rickets and in pregnancy. There is a juvenile tetany and a tetany due to gastro-intestinal diseases." Howland says: "Those who believe that lesions of the parathyroid are the cause of all cases of tetany point to the abnormal teeth often seen with it as a proof of their contention, but tetany seldom occurs without rickets, and it is hard to tell whether it is the tetany or the rickets which affects the teeth." The defects in the teeth, according to the age at which the attack occurs, clinically associated with tetany and rickets, are summed up by Fleishman (9) as follows: "The dentin toward the root of the tooth is quite free from lime; enamel hypoplasias in goblet or basin-shaped cavities or in circumferential rows (Figs. 10, 11 and 13) mark, not only one, but all of a group calcifying at the same period," and he stoutly maintains that these conditions, which were formerly blamed on rickets, are produced by tetany and hence due to the parathyroids. (The writer would call Dr. Ottolengui's papers on root resorption to your attention in this connection and emphasize his discussion of the last one.)

Tetany has been relieved by calcium feeding and parathyroid implantation. MacCallum (11) sums up this very obscure matter by saying: "It is certain that they (the parathyroids) exercise a peculiar, and very important, function in preventing the appearance of an extraordinary change in the circulating fluids, which produces extreme hyper-excitability of the whole nervous system..." "There is much evidence that it produces or even consists in a disturbance in the metabolism of calcium and that the parathyroids control this." One physiologic fact stands out

to the dentist, that in the thyro-parathyroid glands we have two organs, *which by internal secretion have to do at the same time with metabolism of calcium and the nervous system*, with all of the connective tissues and enamel, which latter they help to form, and, that, when disturbed, they can produce overgrowth or undergrowth of these tissues by the way of the blood stream.

The Pituitary Body. The hypophysis or pituitary body, consisting of the pars anterior, pars posterior and pars intermedia,

when absolutely extirpated, produced death and functions differently for each part. Out of the mass of contradictory evidence we quote Cushing as follows: "The pars anterior (12), so far as we can tell, presides more intimately over skeletal growth (Figs. 5 and 6); whereas the posterior lobe has been shown to be more closely allied to the processes of tissue metabolism... an insufficiency in it causing a marked deposition of fat and it is also associated with the activity of the renal and vascular systems." As this gland has to do with growth and sex characteristics, it is in close touch with the sexual glands and is always enlarged by pregnancy, castration, etc., hence lesions affecting it produce symptoms according to the period at which they occur, before or after puberty, or when the skeletal growth is complete. Approximately, it may be said, that hyper-pituitarism, with hyperplasia of the anterior lobe, before puberty and depending on epiphysial ossification produces giantism, while after puberty it produces acromegaly. This is a discussed point, and Cushing says: "Acromegaly (12) cannot precede giantism, but may be grafted on it," therefore it is incorrect to associate acromegaly with childhood (Fig. 7). In giantism, a lesion occurring before puberty, there is excessive growth of the long bones with marked exostoses and persistence of the epiphyses; hypoplastic sexual conditions, impotence in men and cessation of the menstrual period in women. In acromegaly, a lesion occurring after puberty, enlargement (Fig. 7) occurs in bones already complete, including the mandible and occasionally the maxilla (Fig. 8) with spacing between the anterior teeth, which tip outward; enlargements of the hands and feet, nose, larynx, tongue and lips, including the antra and frontal sinuses. Biedl says: "Investigations (6) of the histology of these bones show that these results are due to deposition and resorption of bone substance as in normal growth."...

Cushing makes a classification, dyspituitarism affecting facial regions (Fig. 8). You are referred to his work on this subject (2).

Hypopituitarism. Hypopituitarism, where many symptoms are common to the hypertype, is marked by stunted skeletal growth (Figs. 5 and 6), forms of dwarfism, genital hypoplasia and infantile sex characteristics, with great deposits

of fat; Cushing (12) mentions nasal prominence, due to sphenoidal distortion (Fig. 8) as contrasted to mandibular enlargement in acromegaly; there is a particularly high sugar tolerance and a preference for large amounts of sugar and carbohydrate food; sugar, as such appears in the blood, and it is notable that Cushing (12) and others insist that other endocrine bodies besides the pituitary enter into the sugar question, as the thyroids, parathyroids and adrenals. It is said that both these conditions are the result of struma in or near the pituitary, producing pressure, illustrated by the neighborhood symptoms, as on the optic nerve causing hemianopsia, and the gland may hypo- or hyper-function, finally ending in glandular insufficiency.

The significance of all of the foregoing to the dentist is, that he should differentiate acromegaly from mandibular protrusion from other causes (compare Figs. 7 and 8 with Figs. 10, 11 and 12) and be able to recognize the tilting forward of the anterior teeth and increase in interdental spaces. *The orthodontist should bear in mind, no matter what his theory, from the numerous cases showing improvement in the pituitary syndrome, that it may yet be possible to relieve some of these symptoms by spreading the arches, possibly by drainage of the ethmoidal and sphenoidal sinuses, relief of lymph blocking or of the circulation; the forces acting in some way not known; but he should never speak of relieving pressure in the basilo-sphenoid and allowing the pituitary to sink from sellar decompression, by widening the arch, for that is impossible mechanically and anatomically, and he should always bear in mind the fact that "the base of the skull is an entity."*

There is not sufficient time to go into this important subject and you are referred to the clinical evidence of Hawley, Barnes, G. V. I. Brown, and Price, and to the numerous papers including that of C. M. Wright, M.D. (33), which we paraphrase briefly as follows:

Dr. Wright shows that "malformations, which interfere with normal performance of physiological function of the accessory sinuses of the nose, together with interference with the lymphatic circulation within the nasal fossæ, are directly responsible for such intercranial conditions." Explaining the relation of the emissary veins, the foramen cæcum and the circulation of this region, he quotes McClellan's Edition (*Reference Handbook of Medical Sciences*, 1901): "In children there is always a communication between the nasal veins and the superior longitudinal sinus through the foramen cæcum; this is usually closed at puberty, but may continue in the adult." Having proven the venous stasis in these conditions, he shows that the same cause will produce lymphatic stagnation, quoting Cunio and Andri, to the effect "that the peri-meningeal spaces communicate with the lymphatics of the nasal fossæ across the

cibriform plate of the ethmoid by canals, which are independent of those for the sheath of the olfactory nerve." Tilly is quoted to the effect that "direct communication between the lymphatics of the olfactory region and the basal lymphatics of the dura mater has been demonstrated beyond a doubt," and Wright concludes that "this lymphatic stagnation, then we must admit, plays an important part in the sequella of nasal obstruction, affecting the function of the base of the brain and its contents." In the light of the foregoing orthodontists and surgeons should not be over-hasty in their judgment of the validity of the claims in certain well-authenticated cases presented by experienced clinicians, which appear very much to the writer as the relief of lymph blocking and return to function of a circulatory stasis.

The thymus body* increases in size from the embryo up to the second year, after which it functions and gradually involutes at puberty; it occasionally persists when this cycle is defective, particularly after castration or in early hyposexual states.

The Thymus Body. That it presides over bone growth is shown by the fact that "the (8) femur of a thymectomized dog only contained one-half as much of the tricalcic salts as the control, and the bones could be cut with scissors"; when the thymus is insufficient, "artificially produced fractures unite only by connective tissues." Ott says: "The alkali depot in the bones acts as an antacid depot. The thymus is, perhaps, in the young animal the chief organ for the synthesis of nuclein; its removal would leave the neuclinic and phosphoric acid to cause an acidosis; these acids dissolve the calcium salts or hold them in solution. Thymus extirpation causes, in animals, rachitis, osteomalacia and osteoporosis." The thymus is a lymph gland and the hyperthymic state, known as the status thymo-lymphaticus, is always fatal to children: there also may be many smaller phases of this generally hyperplastic lymph condition, described by Paltauf. It is therefore of interest to us in this consideration, for hypertrophic states of the pharyngeal and faucial tonsils and all the post pharyngeal region, have been associated with hyperthymic state in minor phase. As many unite in thinking that the thyroid controls the thymus (34), and, that it, together with the spleen, finally takes up the thymus function, an athyrosis in the infant would permit of overgrowth of all the post pharyngeal lymph areas, possibly producing adenoids.

*You are referred to the recent work of Halstead (34) who has shown the relation of the supposedly vestigial thymus in adult goitre cases to hyperthyroidism, occurring after thyroidectomy, demonstrating, that the association of these glands is more intimate than was supposed.

Suprarenal Bodies and the Chromaffin System.

Cavarzan (29) claims that deficient function in the adrenals interferes with normal skeletal growth and reports forty-seven cases of osteomalacia cured by epinephrin administration; so no study of this subject is complete which overlooks the extremely important relation of the suprarenal bodies and the chromaffin system to the great sympathetic nervous system, which has so much to do in a trophic way with the development of the head and face. Chromaffin tissue exists alike in the sympathetic ganglia and the medulla of the adrenals. Starling says (3): "A list of the actions of adrenalin, the active principal of the suprarenals, is identical with a list of the chief functions of the sympathetic nervous system," and Biedl agrees that "adrenalin (6) is the hormone by which irritability of the sympathetic is regulated." Some of the functions of the sympathetic are: heart, muscle, and vascular tone and control of blood pressure; it also regulates the amount of sugar in the blood and glandular secretion generally as that of the saliva, for instance. We must remember, that it is these trophic processes, more or less blood to the part, which constitute the only acceptable theory given thus far on the obscure question of tooth eruption, the root and alveolar absorption that permits it, and the physiologic repair which rebuilds anew the alveolus. There is also a demonstrated relation of the chromaffin tissue in the adrenals and sympathetic to the same tissue existing in the islands of Langerhans (Cohnheim), in the pancreas, controlling carbohydrate metabolism and involved in the etiology of diabetes; and just as there is some unknown relation of the testes to the salivary glands in mumps, as salivary secretion is controlled by the sympathetic, we cannot but believe that this may have something to do with the carbohydrate content of blood, possibly the saliva in excessive dental caries during the stress periods mentioned in the synopsis.

The Sexual Glands, Testes in the Male, Ovary and Mammary Glands in the Female.

Castration and eunuchism have long been a proof of the internal secretory action of the cells of Leydig (interstitial cells of the testes), the hormone from which controls bodily growth and the union of the epiphyses. The phenomena of senility fairly represents the further hypo-action of these cells, but it is in the relation of the corpus luteum of the ovary and fetus to lactation, that our greatest interest centers. There is no better illustration of the inter-relation of all this group than in the development of mammary glands and milk secretion, which Starling and Clapon have proven can be produced independently of nervous control.

Ott (13) and Scott say: "That several glands concur to increase a secretion was well illustrated in that of milk, where we have five: infundibulin, pineal, corpus luteum (3), thymus and mammary." It has already been shown that the thyroid, parathyroids and pituitary are prominent in this cycle, as they are enlarged and finally depleted by continued lactation. Human milk is a composite of the blood content suited to nourishment of the child at different periods of growth, as proven by Starling in the increasing percentage, proportionate to age, of lecithin, a phosphatic fat constructive of the nervous system; immunity or disease of the mother can be transmitted to child by alexins and antibodies or toxins, which have been demonstrated by Welch and Ehrlich (3) in human milk, and it is probable, as all of these glands concur in its secretion, that their hormones exist as such in milk, to the early activation of the whole internal secretory system in the child. This point will be mentioned later. The compensatory and inhibitory action of this whole group is so complicated and little understood as to be merely mentioned; for instance, the thyroid, pituitary and sexual glands are said to co-operate, which seems likely, as all are disturbed by menstruation, pregnancy and lactation. The thymus and adrenals are thought to oppose this group (34); all of which is most confusing, so you are referred to Falta, Eppinger and Biedl. This whole phenomena of growth of the child is recently summed up by Hastings Gilford (14) as follows:

The Effect of the Ductless Glands upon Development.

"We find by virtue of their secretions, or in some cryptic manner, that they preside over certain correlations of the body. These correlations are by no means rigid, but indeed exceedingly variable, and the variability is most apt to be shown when circumstances are abnormal. The adjusting mechanism of development is not only flexible, but is more or less reciprocal, so that a ductless gland both influences development and is itself changed by general development."

"In this harmony, which is produced by concerted action of the ductless glands, we have reason to suppose that the leading part is played by the thyroid. This supplies a stimulus for the metabolism of the body as a whole. During infancy and childhood, when it is most important that the fires of metabolism should be controlled, the influence of the thyroid is checked by the thymus (34) and by the lymphatic system in general." "This brings about that delay of sexual activity which is so essential to proper maturation and stability of the somatic faculties." "Probably the first to break through the cordon of conservative influences is the adrenal system, which awakens the dormant sexual organs and hastens growth of the skeletal and muscular systems. Development is further stimulated by the pituitary, which awakens every organ

in the body, including sex organs. These latter ripen now apace, and assisted by the combined action of the ductless glands, some awakening and some resisting, carry the development of the body on waves and ties to its flood." From the evidence quoted it is plain that the thyro-parathyroid apparatus is the controlling factor, active in child growth opposed or assisted by the poly-glandular syndrome; this has a most important bearing on our hypothesis relative to the excessive lymphoid state and hypertrophic pharyngeal and faucial tonsils as mentioned by Gilford when he says: "The thyroid is checked by the thymus and by the lymphatic system in general," while Gierke (15 "believes that the two glands compensate*" (34), at any rate it is probable that thyroid insufficiency or athyroses in infants, may allow increased thymus function and general overdevelopment of the post pharyngeal lymph area, thus producing adenoids, and it is a striking fact that the enlargement of both tonsils is coincident with delayed development of the face and arch, just as it is associated clinically with malocclusion, the percentage of children suffering from all these conditions being about the same. The statement of Waller (16) and Williams (17) that these enlarged tonsils have been reduced by thyroid feeding is very suggestive and needs thorough clinical study.

Norregaard calls attention to the close anatomic relation of the pharyngeal and faucial tonsils to the thyroid explaining that comparative anatomy shows a direct communication between this lymphoid area and the thyroid in some animals. Weglowski, who found traces of direct communication between these throat areas and the thyroid in thirty per cent. out of one hundred and fifty-three cadavers from the fetus to old age. It is Norregaard's opinion that a large percentage of thyroiditis arises from primary focal areas in the tonsils also illustrating this connection.

There is another very prominent factor causing thyroid insufficiency brought out by Waller (16) and accepted by many, *i.e.*, that nearly all of these glands are disturbed in function, hence rendered deficient in secretion, by early attacks of the infectious disease of childhood, measles, scarlet fever, chicken-pox, etc., particularly the thyroid, and, if as stated, this gland is controlled by the thymus lymphoid cycle, when its inhibition is removed, through damage from measles, for instance, there should be hyperplasia of all tonsillar tissue, which would shortly lead to hyper-

*So definite is this relation that recently, 1914, Halsted, at the J. H. Hospital has gotten satisfactory results confirmed by histologists by destroying the remnants of the thymus by the use of Roentgen rays after the Basedowic symptoms persisted following successful goitre operations: the idea being that the thymus vestige picked up the function of the missing thyroid.

tropic, tonsils and adenoids, which are open always to infection. As a matter of fact, adenoids are said to be produced by this very group of diseases, and as confirmatory of this statement, "a healthy internal secretory apparatus is considered the greatest safeguard against such diseases." It can now be accepted as proven that this cycle of internal secretory organs absolutely controls the formation of the facial bones, nasal and post nasal, as well as the teeth and their eruption: here too we believe it can be established that the thyroid function is predominant, any defect in which will act through all, seriously delaying development. Thyroid insufficiency and its expression cretinism in children is quite the commonest of all the marks of defective internal secretion, and we again call your attention clinically to the mouth and pharyngeal defects of pronounced cretinism (Figs. 2 and 3), the premaxillary protrusion, and irregularity of the teeth; the closed sinuses (Figs. 9, 10, 11 and 12) and deflected septa; the enlarged tonsils and tongue, and ask that you carefully compare these with the more minor defects we are called upon to correct. The enlarged tongue associated by medical observers with these conditions is a striking feature, and the question arises, did the hyperplastic tongue protrude the teeth or the narrowed arches crowd the tongue into the pharynx and produce mouth breathing, according to Cryer's idea? As deficiency in the cretin at first prevents development and the closing of the sutures and epiphysis in long bones, where they finally ossify in shortened relation as in the dwarf, with synostosis of the skull and face bones as Starling states (3), *why should it not in the child, suffering from athyrosis in less degree than in the cretin, delay the closing of all the sutures which go to unite the face to the skull? viz.: the palate, sphenoid ethmoid, malar, nasal, frontal, vomer and maxillary, and then close these undeveloped sutures in distal relation, preventing forward and downward development of the maxilla and mandible, locking the whole area in bad occlusion and interfering with full development of all the accessory sinuses and nasal septum?*

**Time of
Closing of
Sutures.**

We can consider now with profit the periods given by various anatomists, who do not all agree, for the closing of these sutures. The following description is but a brief outline suited to the time allotted this paper and is not exact. The body of the sphenoid is developed in two large sections, the post-sphenoid, containing the larger part of the sella turcica and the posterior clinoids; and the pre-sphenoid, containing the lesser wings and anterior clinoids, which unite to form the basilo-sphenoid, directly under the pituitary body, a little after birth, in the first stress period of growth given in the synopsis.

It is easy to conceive how a tendency to hypopituitarism might be induced thus early by delay in development of this area, previously ascribed to thyroid insufficiency by imprisoning the growing gland in undeveloped bone, all of which producing outspoken defects later; this is confirmed by studies of the sella in cretinism already quoted, and Gilford's report (30) of a case of ateliosis (arrested development) where he says: "The pituitary is apparently encroached upon by the projecting clinoid processes." Further, the greater wings, the third free portion of the sphenoid, at this period, do not unite with the basilar portion until the end of the second year, as these wings articulate with the palate bone, which in turn joins with the superior maxilla: they are the strongest sutures of the internal attachment of the face to the base of the skull. Cryer says: "They give support to the superior dental arch." *It is more than significant that nature leaves this whole area unattached, until all the temporary denture is fully in occlusion,* and that ossification is not complete between the basilo-sphenoid and the basilar portion of the occipital bone, until between the eighteenth and twenty-fifth year. The palate bone, the wedge which unites this whole area, through the greater wings of the sphenoid to the maxilla is developed early; ossification proceeding from two centers for the perpendicular plate, passes toward the articulating edges, which, due to any deficiency in internal secretion or calcium metabolism mentioned, might be delayed in ossification, just as the epiphysis under like condition, and produce a shortening, placing the whole maxilla in distal relation. The zygomatic portion of the temporal, which articulates with the similar process of the malar, bracing the front of the face, does not unite with the rest of temporal bone until well into the first year after birth. The crista galli and perpendicular plate of the ethmoid, which assist in the anterior superior facial support, do not begin to ossify until the end of the second year, and the sphenoturbinates, entering into this articulation, are not attached to the sphenoid until the second or third year. The vomer, keying this region to the maxilla, develops from two lamina, inclosing the cartilage, by two centers, which are not entirely completed until puberty. Coming to the maxillary bones, the premaxilla are supposed to unite shortly after birth, but it is interesting to find Mosher (18) contending that they really are not completed until the third or fourth year; prior to that time, he says: "They are mere shells holding the temporary and permanent teeth and do not acquire solidity until the permanent incisors are well on the way to eruption." That the palatal processes of the maxilla rarely develop to full width is shown by the lingual relation of the first molar region, which in orthodontic work, nearly always needs expansion. You will, no doubt, associate all of these periods for the closure of this region, articulating the face to skull with Cryer's remark explaining how weak this union is to

any force applied from within outward and also the striking resemblance in the times named for suture hardening to tooth eruption, which begins for the temporary teeth about the sixth to eighth month after birth, and is about complete by the second year; particularly the eruption of the first permanent molars which is between the fifth and sixth years. None of the numerous theories explaining the eruption of a tooth are satisfactory, just as are none of the theories for the formation of accessory nasal sinuses. W. B. Davis (19), in explaining sinus development, describes the formation of an embryonal epithelial pouch which lies against the bone producing absorption; this invasion is followed by the entrance of air or pneumatization, and this whole process is strikingly similar to the eruption and advance of a tooth; the bony crypts are resorbed only to be built again in sinus formation, just as a tooth advances. Whatever may be the primary cause, both of these processes come under the supervision of vaso-motor and trophic nerves of the sympathetic, which has been shown through the chromaffin system to be controlled by the endocrine glands or internal secretion, *any insufficiency in which, would interfere with the synchronism of all of this growth, which is marvelously timed in the normal.* If this be true, such defective secretion might well delay sinus development as well as cause irregular dentition, producing mal-occlusion and dental impaction, with pressure areas even impaction on certain nerves ending in the "stress of dentition" which Kirk (20) has shown may extend its neuroses and reflex irritation even up to the time of the eruption of the third molars. Josefson (21) presents, in a recent report, a mass of radiographs and clinical evidence to show that tardy dentition is a warning that development of the body is not progressing as it should and claims there is some disturbance of the whole ductless gland system. He recommends systematic organo-therapy (Figs. 2 and 3) during pregnancy in families with a tendency to abnormal dentition and growth of hair, and many medical observers insist that there is early resorption of roots and loss of temporary teeth in rickets and tetany, and quite the reverse in tuberculosis.

Feeding Infants.

When we consider the embryology of this whole question; the evident analogy of epithelial enamel and hair; the development of the maxillary arch, for instance, and the greatly divergent anlagen from which the premaxillary portion has to descend and the palatal processes ascend; when statements such as Josefson's are daily occurring in medical literature, it behooves the dentist to prove, or as often disprove, every word of them. We believe one of the principle causes for internal glandular insufficiency to be the present method of artificial feeding of infants and that correct baby feeding is one of the keys by which we will unlock

this problem. Cow's milk which may be modified to the correct percentage of protein, salts, and carbohydrate to suit the growing age of the child, is lacking in certain vital and yet unknown factors contributing to bone growth and preventing such conditions as tetany, rickets, etc. It has already been shown that immunity, as also disease, may be conveyed from the mother to the child by breast feeding, and that many internal secretory organs preside over lactation, particularly the thyroid; Bramwell and many others having increased the milk of wet nurses by thyroid feeding, and "it (22) is quite probable that some internal secretion, necessary for perfect nutrition, which is secreted in mother's milk, may be absent in cow's milk, hence bottle fed children may not receive it." Meigs and Harsh (23) report "that human milk differs in three ways from cow's milk, i. e., *first*, considerably more lactose; *second*, much less protein, and *third*, more substances which are important constituents of diet and are soluble in alcohol and ether, but contain no nitrogen, and whose chemical nature is unknown; in the middle period, human milk contains five per cent. of this substance, while cow's milk contains but three per cent." Starling and Clapon insist that these substances vary with different species, Starling saying: "It (3) is impossible, therefore, satisfactorily, to replace the natural milk of an animal by that of another species"; beside these activators of the internal glandular system, there are just as important elements such as various salts and particularly the lecithin content. Lecithin is most important in building the central nervous system and Starling proves, that we have a progressive adaptation of milk to growth, according to the lecithin content in each species: "(3) the calf's brain is only 1-370 of the whole animal with lecithin to protein 1.4 per cent., while the infant's brain forms 1-7 the body weight, with lecithin to protein 3.05 per cent.;" hence the infant would require three times as much lecithin as the calf, otherwise serious nervous disturbance might occur. It would then be quite impossible to start into early function the whole internal secretory system and nourish the infant's developing nervous system with manufactured baby foods; this cycle would be activated earlier with cow's milk, containing three per cent. of such substances, and 1.4 per cent. lecithin, but still there would be that delay which we consider the real cause of all these dental ills, even with modified cow's milk; while with breast milk from a healthy mother, all of this syndrome of growth quoted from Gilford, would be started at once, in the early extra-uterine period, preventing, we believe, defective forward suture development, "the stress of dentition," enamel hypoplasias (Fig. 10, 11 and 13), and such symmetrical enamel defects as lay the tooth open to caries, etc. W. A. Price (24) associates a number of cases of enamel hypoplasia with the use of artificial baby foods, and in a strong résumé, severely censures the users of

such foods. In discussing this report Dr. E. C. Kirk (24) said: "It has been pretty definitely shown by a number of observers that the secretions of certain of the ductless glands, particularly the parathyroid, has something very definite to do with the process of calcification; that, where the parathyroid is destroyed or diseased, we may feed phosphatic food, and it is not assimilated and the quantity of phosphatic food that is taken to the stomach under these circumstances is rapidly eliminated in equal amount. It is also pretty clear, in the milk of the nursing mother, certain of these important stimulative properties of the ductless glands pass, and, though the child may receive phosphatic nutriment materials in some other form, it is the lack of this stimulus which prevents the child from assimilating the phosphatic elements of artificial foods." Many agree with Starling (3) when he says: "There is no doubt that, of the children dying during the first year of life, four-fifths are murdered by unnatural methods of feeding." W. H. Davis (25) states the fact that "the bottle fed baby is six times as likely to die as the breast fed," and while, no doubt, a good part of this percentage is due to intestinal diseases, there is another element in the generally accepted fact "that the bottle fed baby is much more susceptible to communicable diseases than the breast fed baby." We wish to accent again that Erhlich and Welch have proven the antitoxins which pass over from the mother to the child in human milk "will (3) provide it with a certain measure of passive immunity against possible infection by disease to which its species is liable." *Now all of this is most important, for it has been already established that the organs of internal secretion in childhood are peculiarly liable to damage, hence insufficiency from just such early attacks, as measles, chicken-pox, etc.* In the bottle fed baby this immunity is not maintained and causes glandular insufficiency, which from any cause will produce dental lesions and enamel hypoplasia, all of which have for years been associated by the dentist with such infectious diseases; it also explains the writer's series of such collected from children of tuberculous parents. On the other hand, quite as much harm has been done by too prolonged breast, without supplemental feeding or the insistence on feeding the child by the mother with defective milk; rickets and spinal deformities are quite common from this cause, all of which is made clear in recent statements as follows:

"It (22) is also quite probable that some children, even if breast fed, suffer from calcium malnutrition because of defective secreting glands (internal) in the mother; also one or more of the glands of internal secretion in such defective children may be acting insufficiently." The writer does not care to be classed with the breast feeding "faddists," but suggests that in the study of oral defects, all of these diverse conditions

Orthodontia

be reviewed and carefully tabulated; a sensible attitude is that of H. M. McClanahan (26) whose conclusion is, "unless the mother is suffering from serious illness, she should nurse her infant (*for these valuable activators**), supplementing such nursing by other feeding," and such is the practice in several large institutions where the milk of a few wet nurses is apportioned amongst all the children. Finally, the following statement from A. Hrdlicka, who has studied this whole question of the nasal passages, adenoids and tonsils, dental arches and teeth, in primitive people, from the standpoint of comparative anthropology, is convincing. Dr. Hrdlicka reports a study of over nine hundred and sixty Apache and Pima children, and from his broad experience he states, in all the children examined that:

"There was no abnormal narrowing of the max-

First.illary arch nor protrusion of incisors and no irregularities, except sporadically a little crowding of the incisors, and that the arches are broader in the second temporary molar region than in the whites of same type of skull, with the bones generally heavier."

"That in all his personal experience, he never

Second. saw a case of adenoids nor knew of a tonsilitis in an Indian child, although he made careful observations of the breathing of these children both awake and while asleep."

"The Indians have had, and still have, the habit

Third. of keeping up the nursing of the child until the second or third year or even later, and the important fact was developed that the Indian mother gave her child various things to chew very early, while she still continued feeding late; here we have the double value of use of a natural sterile and easily digested food, supplemented early by more or less solid foods."

"When asked if open air sleeping did not prevent

Fourth. adenoid vegetations among the Indians, he quoted many facts to show that often the Indian (the Pima, for instance,) slept under the worst possible ventilation; the mud hut is completely closed by blankets against air, and many sleep in one room."

"He accentuated again his idea that evolution

Fifth. was going on in the human skull, face bones, base of skull and teeth, and that it is largely due, so far as the jaws, teeth and facial bones are concerned, to lack of use of the organs of mastication; this tendency to degeneracy due to disuse, and the

*Author's italics.

still advancing evolution must be recognized as an important factor in all of our considerations."

You are referred to Dr. Hrdlicka's numerous papers (27) on this subject, and we would accent his statement, as to normal width of the temporary and permanent arches in Indian skulls, showing correct bony development of the palatal processes in the region of the first permanent molars, associated with absence of adenoids produced we believe by correct baby feeding and particularly early use.

The metabolism of calcium and other salts, is so intricately involved in this question of breast feeding, the internal secretions and bone and tooth growth, that no consideration of the subject would be complete without mentioning it. You have heard how the parathyroids preside in some unknown way over calcic waste, which, if not relieved, in the youth if not in the adult, will so profoundly affect the nervous system as to produce convulsions and death, and that calcium feeding will often relieve such states, as it will post-operative tetany. As confirmatory of what has been said we quote a recent article, as follows: "Many (22) of the glands which have an internal secretion, the thyroid and para-thyroid, ovaries and testicles, pituitary and the thymus, in infancy and childhood seem to take a part in normal bone metabolism." "The calcium in the blood has been found to be highest in the child; it decreases slowly with age, being higher in breast fed than in artificially fed children, who seem to retain calcium longer and to store it; it is also more in evidence in breast fed infants, than in those who receive cow's milk....; coagulation of the blood will not occur except when the salts of calcium are present." Ott says (8): "Bones (*and we might add teeth**) are chiefly composed of ninety per cent. calcic phosphate and carbonate (*this refers to the inorganic percentage**); these are the alkali stores in bone; when the quantity of alkali decreases, these insoluble calcium salts become soluble. In the period of growth of the young there is a great breaking up of nuclear substance, forming nucleic or phosphoric acid, which may circulate in the blood dissolving the calcium salts and causing an acidosis." "We (22) are more and more coming to understand that condition of the body which may be termed hyperacidity, or, at least, a lessened alkalinity especially of the blood—imperfect excretion of acids or acid salts by the kidneys or bowels will sooner or later cause some serious functional disturbance, some degree of denutrition or serious disturbance of the nervous system, and infant marasmus and gastro-intestinal conditions are due to diminution of alkalies."

*Author's italics.



Of all the phases of disturbed metabolism, calcium waste should hold the interest of the dentist; among, the few coming under our notice may be named, the early resorption of the roots of the temporary teeth and their too early loss, and for the same reason, delayed eruption of the permanent teeth (Fig. 10). Also Waller's idea of the ratio of salts excreted by the salivary glands and appearing in the saliva in relation to dental caries; excessive amounts of certain forms of salivary and serumal calculus and that opposite type, the erosion mouth, one of the expressions of the hyperacid diathesis, where no deposits occur in the teeth, but the acid sodium and calcium salts produce cervical tooth destruction and have been proven in the saliva. Erosion has in more than one instance been associated with deficiency of the thyro-para-thyroid apparatus in middle life and after, by the writer *who is also convinced that there are many varieties of wasting and decalcification of tooth structure which are primarily not the work of micro-organisms, though later caries may lodge and grow thereon as it would on mechanical defects*. It must be remembered that the periods of stress, first and second dentition, puberty, pregnancy, the climacteric and senility mentioned in the beginning of the paper, when internal secretion as apt to be disturbed, are also the periods when caries is at its worst, and these also are the periods of defective calcium metabolism. There are also well-authenticated cases of dentinal resorption via the pulp, one of which was reported by the writer (28) which this idea of defective calcic metabolism alone will explain as it does the internal dentinal defects of pregnancy, senility and possibly tuberculosis.

In conclusion, it may be said that the dentist of the present and the future can no longer afford to conjure with such expressions as "auto-intoxication," which sound much and mean little; he must think straight on the newer lines of a pathology, based on a new physiology, which recognizes the internal secretory organs, and while all disease does not arise from defective internal secretion, it has its place in any pathology, and the great problem is to properly locate it.

Description of Illustrations.

Fig. 1. Arrest of development in a sheep after a thyroidectomy done six days after birth; the larger one is the skeleton of a normal sheep of the same age. (Von Eiselsberg.)

Fig. 2. Thyroid extract in cretinism. (J. B. McGee.) (a) Cretinic idiot seven years old when thyroid treatment was begun. Had ceased to develop when three years old. The typical protrusion, thick lips and enlarged tongue, if it could be seen, the "pot belly" and hands and coarse scanty hair.

(b) Changes after one year's treatment. Growth, $8\frac{1}{2}$ inches. The change in the angles of the face and in expression about the mouth, the limbs, abdomen and general development particularly of hair.

Fig. 3. (a) A cretin, twenty-three months old. (b) The same child, thirty-four months old, after administration of sheep's thyroids for eleven months. (c) A cretin, untreated, fifteen years old. (W. Osler.) Note the typic mouth expression in it and compare with cases presenting for orthodontic treatment. In (b) the result of organo-therapy without the help of the orthodontist, finally the profile, enlarged lips and tongue, scanty hair and swayed back, and general mongolian expression in the fifteen-years-old cretin in (c). From *Human Physiology*, Starling.

Fig. 4. Cretinic obesity. Case of cretinism, aged twenty-one. Effect of four months' thyroid treatment. (Sanderson.) From Sajous, *Internal Secretion and Principles of Medicine*; Vol. I.

Fig. 5. Peter Krantz. From *Deutsche Zahnheilkunde*, 1914. (a) Mandible of normal dog. (b) Mandible of a dog after losing its hypophysis.

Fig. 6. Peter Krantz. From *Deutsche Zahnheilkunde*, 1914. (a) Microphotograph of a section of a normal dog's tooth. (the control from the litter), showing size of pulp chamber and tooth and type of dentin.

(b) Microphotograph—under the same conditions—of a section of a tooth of a dog (same litter) from which the pituitary (hypophysis) had been removed.

Note the reduction in size of the diameter of tooth and the great increase in the pulp chamber, showing a control of the pulp function and dentin formation.

Fig. 7. A. Note photophobia; spacing of teeth; full oedematous hand; and characteristic acromegalic profile.

B. Patient at twenty-five, before onset of the malady, contrasted with present condition.

From Cushing: "*The Pituitary Body and Its Disorders.*" "Hyperpituitarism of eight years' duration with outspoken acromegaly."

Fig. 8. Note (left) spacing of teeth; strabismus; adiposity; (right) profile with maxillary rather than mandibular prognathism.

From Cushing: "*The Pituitary Body and Its Disorders.*" An Extensive hypophysial struma with dyspituitarism evidences of former activity shown by slight acromegalic changes.

Note: Cushing repeatedly calls attention to maxillary as well as mandibular protrusion with spacing of the anterior teeth in both jaws caused by pituitary disease.

Fig. 9. Barbara Poehl, born April 6, 1856, in Martinsheim, died Jan. 23, 1887, thirty-one years of age. Could neither walk, stand nor eat

without aid, and her body looked as though it belonged to a two-year-old child, whereas the head was the size usually found in grown-up persons. The superior maxilla seems fairly normal, with the exception of some slight malpositions of some of the teeth, whereas the mandible or inferior maxilla shows nineteen teeth, the entire right side and the incisors upon the left side being double.

Peter Krantz. From a reprint from the *Deutsche Monatsschrift fur Zahnheilkunde, 1912.*

Your attention is called to the results of defective calcium metabolism shown in the retention of the first dentition (Abb. 19a), the prognathism (Abb. 19c), the width of the arch in the molar region (Abb. 19b), yet the crowding of the incisors in the premaxilla (Abb. 19b).

Fig. 10. Anna Volk, thirty-year-old cretin, died in the Maternity Hospital at Grazer, from eclampsia, on the 6th day of December, 1877. Cretinous skeleton No. 3235; shape of the head oval, superior maxilla asymmetrical, the alveolar process upon the left side reaching more deeply. Occlusion fairly well preserved. Open bite. The teeth are separated to the extent of from two to three millimeters each. Upper incisors are ridged or grooved. Peter Krantz. From a reprint from the *Deutsche Monatsschrift fur Zahnheilkunde, 1912.*

Note the protrusion and spacing of the incisor groups associated with enamel hypoplasia labial central incisors.

Fig. 11. Katharina Temmel, seventeen years old, single, a cretin. Born in Grafendorf near Steinz. Died Dec. 22, 1881, in the General Hospital at Graz. Skull No. 3663.

Peter Krantz. From a reprint from the *Deutsche Monatsschrift fur Zahnheilkunde, 1912.*

Note the premaxillary protrusion and compare it with adult malocclusion said to be from other causes. Enamel hypoplasia well marked on all teeth.

Fig. 12. Ferdinand Stock, from Hirschfeld, died July 1, 1902, at the age of twenty-five years. He was a typical cretin. At the autopsy, no thyroid was found. The skeleton was one hundred and four centimeters long. Skull was medium size. Only a few teeth were preserved and they presented typical rachitic grooving, etc. Cuspids mark prognathism.

Peter Krantz. From a reprint from the *Deutsche Monatsschrift fur Zahnheilkunde, 1912.*

Fig. 13. Female cretin, name unknown and age unknown. Died the year of 1870, General Hospital at Graz, of gangrenous endometritis. Skull No. 1631. Round skull with evident prominence of the distal part of the face. Lower part of the face slightly prominent. Superior maxilla

extends over inferior. Teeth preserved. The upper incisors show distinct undulating grooves.

Peter Krantz. From a reprint from the *Deutsche Monatsschrift für Zahnheilkunde*, 1912. Note the well-defined enamel hypoplasia, incisor and canine groups.

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The President's Address.

By DR. GEORGE Y. WILSON, Colorado Springs, Colorado.
Read before the Colorado State Dental Association at the annual meeting in Manitou, June 25, 1914.

Mr. Vice-President, Members and Guests of the Colorado State Dental Association:

It is our good fortune to be assembled for the third consecutive time in this charming little city. Manitou has long been noted for her health-giving waters, her pure air and grand scenery.

Snow-capped Pike's Peak looms above her. The historic Ute Pass begins its wandering course within her borders, and the far-famed Garden of the Gods brings its malformed rocks as an additional attraction.

In the midst of all this grandeur we have come together for our twenty-eighth annual meeting.

At our meeting a year ago you conferred upon me a very great honor. And while I highly appreciate this honor, I have found (like my namesake in the White House) that this business of being President carries with it vast responsibilities. But I have been fortunate in having associated with me officers and committeees who have done much to relieve me and have borne many of these responsibilities.

I desire at this time to thank the officers and members of committees, and all the individual members of the association who have helped so nobly to make this meeting a success. I especially want to express my very great appreciation of the efficient manner in which our Secretary has discharged his unusually strenuous duties. I am sure we all look forward with pleasure to these annual home-comings. It affords us an opportunity to meet neighbors on common grounds, to grasp each other



by the hand, look into one another's faces and compare investigations and experiences.

Here rivalries, jealousies and controversies can be softened and professional friendships can be formed and cemented; and here you can find opportunities for pleasant social intercourse with worthy men.

Association naturally stimulates ambition, develops intellect, and makes one brighter and more companionable, which in turn gives greater power for growth.

Distances in Colorado and Wyoming are great, and the men located in some of the smaller isolated towns are deprived of the advantages of coming in contact with men who have a common interest in the betterment of our profession. The men in the smaller towns need the annual State meeting and the annual State meeting needs these men. In this connection I would suggest and recommend that the officers of this Association send out at stated periods during the year to the members of the Association a report of the proceedings of the last meeting, and any other items which might be of interest. These could be sent out in the form of a bulletin, and would, I believe, keep the members (especially those in isolated towns) in touch with and help them to maintain an interest in our Association.

Some one has said that "Dentistry is no longer regarded as the little sister of medicine, but is a great and mighty science in itself." We often speak of the wonderful advancement the medical profession has made. We are daily hearing of great medical problems that are being better understood and solved, and how is this accomplished? Probably not by the busy practitioner, nor by medical societies, but by research in their great laboratories, such as the Rockefeller and Carnegie Institutes, by men who give their whole life to the work. We have problems as serious as the medical profession, problems that we have not yet solved, and they are as important to mankind as those of the medical profession.

The Scientific Foundation and Research Commission of our National Dental Association is securing pledges for a fund to be used to secure expert technicians who will give all their time to the working out of such problems as "Special infection of the mouth and their relation to certain systemic diseases," "Studies of the saliva in its relation to caries," "Metallurgical researches for substitutes for platinum," etc. We are fortunate in having such places as the Forsyth Infirmary in Boston, the Evans Institute in Philadelphia, and the Dental and Medical Departments of the University of Minnesota, to which we may carry our troubles and problems. But we need money to support the technicians in these and other institutions. On the basis of securing \$40,000 a year,

**Scientific
Research.**

mission of our National Dental Association is se-
curing pledges for a fund to be used to secure expert
technicians who will give all their time to the work-

each year for five years, from the entire dental profession of the United States, Colorado's proportion will be \$500 per year, or \$2,500 in five years. Will we, the members of this Association, shoulder this small responsibility? I feel sure that we will, and more. "There is probably no investment that the dental profession can make that would be so adequate for both the securing of its recognition in the minds of the medical profession and public and for placing its own science and art on a foundation of truth."

Legislative Committee. We have one new committee this year—the Legislative Committee. It requires considerable time for such a committee to accomplish much; but

I feel sure they will be ready to act when the opportunity presents, and we shall expect them to see to it that Colorado has as good, if not better, dental laws than any other State in the Union.

Reciprocity. There should be incorporated in every dental law a reciprocity clause. An applicant should have a license to practice dentistry is granted by the Board of Dental Examiners located in the State wherein he has lived for five years, at the time of making such application, obtained after passing an examination before the aforesaid board, requiring an equal standard of preliminary education. In addition to possessing a license from the State in which he has practiced and lived for five years, I would require that the candidate bring with him also a certificate signed by the President and Secretary of the Examining Board and by the officers of a Credentials Committee appointed by the State Dental Association. Possessing the above license and certificate and a diploma from a recognized school, the candidate should be given a license by the Examining Board in the State in which he wishes to practice without any examination whatever.

I am a firm believer in making the preliminary requirements both for matriculation and graduation fully up to the standard required by the National Association of Dental Examiners, and I feel that if the candidate is given a diploma from a recognized school of dentistry and succeeds in passing a Board of Dental Examiners and practices dentistry for five years in one State, that if he is good enough to practice his profession in one State, he is good enough to practice on those same patients (and as many more new ones as he can get) in any State in the Union, and I might add in any country on the globe, without any further examination.

If a man is capable of filling a tooth for Mr. Jones while located in Colorado, there is no earthly reason why he cannot take Mr. Jones across into Kansas and fill another tooth for him there, provided, of

course, that he has in his pocket credentials signed by the proper authorities in Colorado, for which the Examining Board in Kansas gives him a license to fill any and all of Mr. Jones' teeth if desired. The Kansas Board would be very glad to be relieved of the responsibility of examining the candidate, for they would realize that the Colorado Board and Credentials Committee know far more about the candidate than they could possibly learn during an examination. Besides, the Kansas Board would realize that the candidate had gone through one gruelling examination before the Colorado Board, which should exempt him from examinations in dentistry the rest of his natural life, no matter in what portion of the United States he may wish to locate.

We read that "Reciprocity is meting out dental justice to all States, nations and individuals." If a candidate wishes to be enlightened as to the so-called "justice of reciprocity" now existing between some of our States, let him decide

Story of a Minnesota Examination. to locate in Minnesota after having practiced for five years in Wisconsin, and the reciprocity and the injustice thereof will have a new meaning for him. He is exempt from the theory portion of the examination. Instead of being tortured for five days, he is let off with a four-day siege. He pays into the Minnesota treasury \$50, as against \$25, for the privilege of coming under the reciprocity ruling. He must present the Minnesota Board with testimonials from two reputable dentists and from two other citizens from the State of Wisconsin, besides, of course, showing the Minnesota Board his diploma and his Wisconsin license. Then he is ready to proceed with his examination, in which he must pass an 85 per cent. mark instead of 75 per cent., as would be the case if he were not in the favored reciprocity class. This Wisconsin dentist, who is probably as capable a dentist as any man on the Minnesota Board, is now assigned a patient and the various operations required are punched on an examination blank. The patient proves to be a hard subject, which, of course, does not add anything to the dentist's peace of mind. Working in a large, crowded room, away from the chair and equipments with which he is familiar, deprived of the service of a trained assistant, and naturally anxious about the results of the ordeal, he finds himself working under a severe strain, and operations which would be comparatively easy for him in his own office loom up as great impossibilities in his present situation and surroundings. But he makes a start and prepares a cavity for an amalgam filling, and with great difficulty adjusts the rubber dam; as the decay has extended far up under the gum. The board requires that the rubber be in position when they are asked to examine the cavity. Each member of the class of seventy-five

applicants is calling for the examiners, and by the time our Wisconsin friend succeeds in getting each of the six members of the board to inspect and pass on the prepared cavity, and has felt the cold, unsympathetic attitude of most of them, and listened to some rather uncomplimentary remarks, he is not in a very calm mood. The completed amalgam filling is passed on in the same manner, and the same procedure is repeated at certain steps in the different operations which follow. The laboratory is at a considerable distance from the operating room, and its equipment in the way of casting machines, etc., are new to him. Methods of constructing some of the work is different from anything he has ever done. For instance, he is expected to make a double-band cast crown, something he has never attempted in all his years of practice. The result is that work which he could have completed in a day in his own office he has difficulty in completing in four during the examination.

I am well acquainted with a dentist who recently went through an examination given by that same board; he is a man who has always ranked well among his fellow practitioners. He was president of his class in his junior year in dental school. He has been president of his local and State societies and has always enjoyed a large practice. He says that this examination unnerved him to such an extent that he could neither eat nor sleep, and he lost ten pounds during the siege. The first day was the hardest day of his life up to that time. The second day was much worse. The third day he could hardly drag himself to the horrible task, and the very thought of asking some of those stony hearted examiners to pass on his work required all the courage he could command. The morning of the fourth day found him almost a wreck, but he succeeded in completing the operations required by the board and went home to await their verdict. After a few days' suspense, he received a little printed form, which read:

"Dear Doctor: On behalf of the Board of Dental Examiners of the State of Minnesota, I regret to inform you that you failed to receive the required percentage at the examination held recently. Very respectfully yours, Secretary."

This whole procedure is neither justice nor is it reciprocity. I call it selfishness, and the very opposite of the Golden Rule. There are no doubt, dentists who would like to locate in Colorado, and if it is a matter of health for themselves or some member of their family, it should be a fraternal privilege for us who have our practice so established to give them an opportunity to earn bread and butter for themselves and those dependent on them. This task for them at first will be very difficult at best, and it is inhuman to add additional burdens in the way of unjust examinations. While it is true that dentists might wish to locate in

Colorado, coming as they would from other States, perhaps other countries, it is also true that many men in Colorado, because of the altitude or other reasons would like to move other States. Is it not enough that they give up a good practice and friends and begin all over in a new and strange State, without having to go through the miseries of an examination?

In our choice of an Examining Board in this State we have men who have shown themselves very capable, broad-minded administrators of justice, and I feel that if our Legislative Committee could succeed in getting a reciprocity bill passed it would place our State far in advance of many of the States which, under the guise of protection to the public, are by unjust examinations trying to keep dentists out of their States.

Our example would be followed in time by other States, and the time need not be far distant when a man with proper credentials may feel that he can practice his profession outside the confines of the State in which he happens to be located. All the world comes to Colorado and has dentistry done while here. And in my mind there is no good reason why dentists who have complied with the requirements of Colorado dental laws, and who have had the proper professional education, may not go out into any other State or any country in the world and practice his profession.

I would recommend that in the near future the President of this Association appoint a Credentials Committee, whose duty would be to co-operate with the Board of Dental Examiners and with the Membership Committee, so that when the proper time comes they will be ready to act.

There are many other subjects of which I perhaps should make some mention, but I feel that this address is already too long.

I have one request to make, and that is that all of you try to be present at the exact time and hour of our sessions. In this way only can sufficient time be devoted to the reading of papers and for complete discussion of same.

Keeping Our Patients Comfortable During Mastication.

By DR. O. L. WHITSON, Pueblo, Colorado.

Read before the Colorado State Dental Association at the annual meeting in Manitou, June 26, 1914.

I am intruding the reconsideration of a very old subject on you at this time because of the fact that so many men in the profession are continuing to ignore it, even after all that has been said and written upon it. This seems amazing to most of us, because of all the factors involved in the filling of cavities in the approximal surfaces of the teeth this one of proper contact is the most important, with one or two exceptions. Our chief consideration necessarily is to stop the decay, but aside from this the maintenance of proper contact becomes paramount. Without this there is little comfort to the patient and no assurance that the tooth operated on will be saved.

Inadequate and poor contact leads inevitably to
**Evil Results
of Lack of
Approximal Contact.** the lodgment of fibrous food between the teeth in the interproximal spaces, and this just as inevitably leads to destruction of the gum tissue occupying that space. If it stopped at this it would be serious enough, but unfortunately it goes further and does greater damage. It has frequently been pointed out that disastrous results follow the impaction of food between teeth, causing injury to the tissues, both soft and hard, and finally resulting in loss of the teeth. It probably never enters the mind of the average operator, even among those who have been impressed with the importance of maintaining the normal contact between teeth, that there is grave danger of losing a tooth as the direct result of bad contact, but the more the matter is studied the more certain it becomes that the loss of very many teeth may be traced directly to this cause.

The reason why this fact is not more universally recognized is because so much time usually elapses between the insertion of the filling and the ultimate loss of the tooth. On account of this, the filling is not suspected, and the responsibility is placed on some more or less obscure cause, which results in recession of the gum tissue and loosening of the tooth. There are, of course, various causes for gum recession, but it is safe to say that in these cases where such disastrous pockets are formed between teeth, the initial lesion was started by the impaction of food due to faulty contact.

The question is, why cannot we of the profession be more observant when these cases present and detect the original trouble in time to remedy

it and save the tooth? Or, better, why cannot we understand the theory of good contact sufficiently to give fillings the correct form?

Diagnosis of Poor Contact. Leaky contacts are usually manifest at a very early stage on examining any mouth. If fibres of food are found lodged between the approximal surfaces, something is wrong, and it should be at once

remedied. Not infrequently our patients tolerate these annoyances because they do not quite know what the difficulty is, and are not aware that there is a remedy. The subject is very often not mentioned by the patient to his dentist until the dentist has first called attention to it. Then he is usually very anxious to have something done, because of all the petty annoyances connected with the mastication of food, this one of faulty contacts is the worst, and when it is known how serious the results may be there should be the heartiest co-operation between the practitioner and the patient to remedy the evil.

It is indeed fortunate for the safety of many teeth that our patients are becoming more and more sensitive to the irritation of food in the interproximal spaces, and will often at once make complaint when this trouble begins, and I am frank to confess that it sometimes taxes the ingenuity of the operator to overcome the difficulty. However, no amount of effort should be considered too great to be expended upon the problem, and this problem involves two important considerations, each one of which should be taken up separately. One is faulty form of the contact point on the tooth affected, and the other is faulty form of the occlusal surface of the occluding tooth on the opposite jaw.

Normal Contact. It is obviously unnecessary to deal at length before this Society with the normal form of the contact point on the approximal surfaces of the human teeth. This we have become as familiar with as we are with our dental anatomy. However, a re-emphasis of a few points may be profitable to us all. In order that fibrous food may not be retained between the teeth, it is obvious that the area of actual contact must be exceedingly small, and that the form of the contact point shall be somewhat sharply rounded. This may not convey to the average observer an accurate idea of the actual form to be found on the approximal surfaces of normal teeth, particularly the molars. The bucco-lingual width of the teeth would give the impression that the contact on the approximal surfaces must be more or less flattened, and this impression seems to be substantiated by the ordinary method of examining them.

If we look into a mouth with a full complement of teeth we see these broad molars apparently in contact for some distance bucco-lingually,

but this is really not the case in all normal conditions. The deceptive thing about it is that when we look into a mouth under these conditions, the interproximal spaces are filled with either gum tissue or foreign matter, or saliva. These tend to a larger degree to obscure the contact point. The only accurate way to determine the exact area of the contact point is to take two extracted molars and place them side by side in the same relation which they occupied in the mouth, and then hold them up to the light. The area in which vision is obscured by the contact will give the actual area of that contact and when this experiment is tried it will be found that even on teeth so broad as molars the area in actual contact is almost infinitesimal.

In making such statements as the foregoing it must be borne in mind that reference is made to ideal normal contact. We see practically every day cases of broad contact caused by the wearing of facets in the approximal surfaces of the teeth through the individual movement of the teeth one against the other, but this is clearly an abnormality, and should not be considered in this connection except for the lesson learned therefrom. If the enamel of the human teeth can be worn to the extent we often see it, then it is apparent that the hardest of our filling materials is none too hard to withstand this wear, and the lesson is that we shall make the contact point on our fillings as dense and hard as it is possible for them to be made.

**Contacts
with Gold
Inlays.**

This last thought of small, narrow, rounded and hard contacts naturally leads us to the consideration of the cast gold inlay, but as I understand that subject is to be taken up separately, and handled much more ably and exhaustively than it would be possible for me to do, even though I could take the time, I will consider the subject of the gold inlay only as to its direct bearing on the subject under consideration, leaving the full discussion of the gold inlay in the very able hands of my esteemed colleague, Dr. Conzett, whose authority to speak to us on this very interesting subject can be doubted by none of us who has the slightest acquaintance with him or the great work he has done along the lines of operative dentistry.

First, by the use of the gold inlay we are able more easily and with less inconvenience to the patient to make contacts that are more true to Nature's plan than we can by the same form of fillings built in teeth in the mouth. By this I do not mean to assert that our best operators cannot and do not obtain perfect contacts on foil and amalgam fillings. We have all seen too many beautiful and perfect restorations to allow of any such argument, but I do mean to assert that the rank and file of operators with the rank and file of patients will obtain good contact with

greater ease and more certainty with good inlays than with fillings.

Nor must we overlook while considering this subject the importance of the occlusal surfaces in our restorations, and we must see that we have in no wise neglected our duty there, no matter what the occlusal surface be, whether it be made of gold, amalgam, or porcelain, or whether the lost portion be replaced with a crown of some kind. That portion of our endeavor which pertains to the chewing or grinding surfaces should be given our utmost consideration and skill in the carving of the cusps, inclined planes, grooves and sulci which go to make up the restored chewing surface, the better to engage the food and make possible the function of thorough mastication, instead of leaving those smooth, wiped, characterless surfaces which we see altogether too frequently.

In former years there may have been some excuse for these very important details not being restored in an ideal and normal manner, but since the advent of the quick-setting amalgam, and that last great boon to humanity, the cast gold inlay, there can be no excuse for any operator who fails to restore any tooth to its fullest possibility as a masticating organ.

**Restoring Position
of Teeth Before
Filling.**

In this connection there is another point that I want to bring to your attention in our operations on these cavities in the approximal surfaces, one which to my mind deserves our very careful consideration.

This relates not only to the form and area of the contact point, but also to the mesio-distal width of the filling or inlay. Usually when a tooth decays sufficiently to involve the contact point the teeth drop together, and this affects not only the two teeth immediately concerned, but it causes a loosening of the contacts on several adjacent teeth. To bring about a proper restoration of the arch on that side again as it should be, involves not only the wedging apart of the affected teeth, but through this means a tightening of the adjacent teeth. Then the filling, or inlay, should be given such a form that this tight contact between all the teeth shall be maintained, and in order to do this it is necessary to make it the full mesio-distal width of the original tooth, and in cases where the arch has been much loosened this width should be somewhat exaggerated. This tightening up of the arch is of the utmost importance, as it gives a stability to the entire side of the jaw, which usually has been lacking since the breakdown of the original contact point.

Two methods may be employed to obtain these results; first, either gaining slightly more separation than is needed, with the accompanying extra tightness of the rest of the affected contact points, and making the inlay of the correct mesio-distal width, when it will slip into place with-

out binding; or, second, by obtaining rather less separation than is required by existing conditions, and forcing the inlay to place with blows of the mallet. Personally, I prefer the method first described. I believe, if anything, it is more exact and definite; also it is easier both for the patient and the operator to try in and fit an inlay which does not bind on the contact point than one which seats with difficulty on account of binding at the contact point, and the further fact that where an extra amount of separation has been obtained the soreness of the teeth caused by the separation will immediately begin to quiet down upon the permanent setting of the inlay, while in many cases where the inlay is forced to place by blows from the mallet, the final separation is quicker and the soreness is temporarily increased.

One thing that must not be overlooked, whichever method is followed, is that there may be a slight change in the position of the teeth. In this way the occlusal relations are sometimes slightly interfered with to the extent of making a cusp impinge too hard against the opposing tooth, with subsequent soreness on closure. It may be necessary under these conditions to grind the offending cusp slightly to relieve the undue stress. In all of our operations this factor of normal occlusion must not be ignored, in fact, must be always borne in mind by the operator, which brings me to the second consideration connected with the problem of maintaining comfortable mastication of fibrous foods, namely the form of the occluding tooth.

We find sometimes cases where patients will complain of food packing between the teeth even when the contact seems normal. This usually happens at times when the troublesome members have never developed decay, and where the contacts seem satisfactory. It also occurs occasionally after we have done our utmost in the way of normal restoration of carious teeth, and unless we understand the cause, it is not only uncomfortable to the patient, but very disconcerting to the operator. The fault is usually with the form of the opposing tooth. The sharp point of a cusp impinges between the affected teeth in such a way as to spring them apart on closure of the jaws and carry fibrous particles into the interproximal space. The remedy is extremely simple and usually brings almost instant relief, though occasionally in cases where the food has been lodging for some time it requires a reasonable period for the teeth to become firm enough not to spring apart.

An easy and accurate method of ascertaining just which cusp of the offending tooth is causing trouble, and also just how much should be ground off, and what shape to give it, is by taking a bite in modeling compound and making plaster models of the case for study and comparison. This gives an exact guide to work by, and no hesitation should

be had in grinding a cusp under these conditions, and change it from a sharp wedge shape to a blunt grinding form which will not spring the teeth apart on closure of the jaws.

Another method, though not so definite nor accurate, but one that will many times serve our purpose well, is the use of carbon paper to detect the cusp that is causing the trouble.

This entire subject of keeping our patients comfortable for mastication, so that this function may be performed in its fullest efficiency, is worthy of our most careful consideration as practitioners, and no matter how perfect our work may be otherwise, with margins above reproach, with density satisfactory and anchorage adequate, we have utterly failed in our best service to the patient if we have ignored this fundamental factor of proper contact. This is my apology for devoting so much of your time to the discussion of what might be called a reconsideration of the contact point.

Efficiency.

By GEO. R. WARNER, M.D., D.D.S., Grand Junction, Colorado.

Read before the Colorado State Dental Association at the annual meeting in Manitou, June 25, 1914.

To my mind the best definition of the word "Efficiency" is the one given in the Standard Dictionary; "The power that accomplishes a desired or designed work." In further explanation it says: "Efficiency brings all one's ability promptly to bear on the thing to be done."

Efficiency has been reduced to a mathematical formula by someone, which formula reads:

$$\text{Efficiency} = \frac{\text{Achievement}}{\text{Standard}}, \text{ or: } \frac{\text{Achievement}}{\text{Standard}} = \% \text{ of Efficiency.}$$

This latter formula would indicate that one's efficiency should be judged by a standard, which I believe is true, and, if one is judging one's own efficiency it will be necessary to change the standard from time to time, for our power to accomplish a desired or designed work should increase if we bring all our ability promptly to bear on the thing to be done.

We have heard so much in the last few years about efficiency and efficiency experts, that possibly some of us have come to think that it is a new thing; or that a new application of the meaning of the word has come to pass; or possibly we may have the idea that it applies especially to large affairs. But this is not so. It is not a new word, nor has there



been any new application of the meaning of the word. Moreover, it does not relate only to large affairs. In the world-old effort to reduce cost and increase output there has been developed of late a more general or more systemized effort toward this end, and in this age of specialization this has resulted in men making a profession of this work, calling themselves "Efficiency Experts," their work being that of producing greater efficiency in manufacturing plants, railroad systems and other large corporations, city management or wherever they find a field for their services.

No doubt this specialization has resulted in a better systemization of the organizations which have availed themselves of the services of these experts. I call to mind many instances where the practical application of psychology, photography, physics, mathematics and other of the arts and sciences has resulted in very marked benefit to the manufacturing plant, railroad, city or whatever organization has systematically used them with the idea of increasing efficiency.

We should not, however, have the idea that greater efficiency can be obtained only by the aid of efficiency experts, nor that it is applicable to, or practical only in large organizations. No! Look at the definition again: "The power that accomplishes a desired or designed work." That cannot be confined to any man or set of men. It applies just as truly to the woman doing her housework, the man working in the field or the dentist at his chair, as to the large manufacturing plant, the great railroad or the city with a million inhabitants.

So let us pay no more attention to the efficiency of the so-called "Efficiency experts," but come to our own profession and ourselves—be our own experts in this matter.

The first essential to becoming an efficient dentist—as I look at it—is natural aptitude. Just where to draw the line between natural aptitude and acquired ability in dentistry is hard to say, but I believe that it is essential for a dentist to have a taste for mechanics, or the "mechanical sense," and an artistic eye. It is possible that all the other qualifications may be acquired.

The next essential is thorough preparation, first in elementary schools, then in secondary schools and possibly in college or university. I say "possibly in college or university" because it is not clear in my mind whether the loss of college training may not be offset by the advantage of training the hands in dental technique that much earlier in life. If the training of the hands could be started early in the teens it would be an immense advantage.

Then comes the dental college training, which cannot be too care-

ful and thorough, but, just how broad the course should be or how many years should be spent in it I would not attempt to say. But no matter how long or thorough the dental college course, it should be supplemented by a period in a dental office under the supervision of the best man possible. This gives the young man an intimate knowledge of practical methods of practice and the business side of conducting an office, that will be of inestimable value to him in developing his own efficiency.

Now that he is ready to start out on his own responsibility after the best preparation possible in his case, what is of the next importance? To my mind it is keeping the machine in good running order. The human machine is like one built of steel; it should be kept in the best possible condition to develop its greatest efficiency. Our profession is very exacting in its demands on the man. No matter how liberal Nature has been to us in regard to good health, most of us begin to feel wear after ten years of active practice, some more and some less, but, we should make the most of what we have. We must necessarily work under unnatural and trying conditions—conditions that tend to break down the physical man rather than build it up. We must, therefore, take greater care and precaution to keep ourselves in good condition than the man who works out in the open, or the man who is not so unremittingly under a nervous strain.

The dentist, in order to keep up to the highest efficiency, must be temperate in all things. He must have regularly a full allowance of sleep. He must take regular, and preferably out-door exercise. He must refrain from the use of all drugs and stimulants, which, of course, includes tobacco. He must by all means have a good vacation every year, and I most thoroughly believe in the five and a half day week of not to exceed eight hours per day.

Besides these things that have been mentioned, the body cannot be kept in good condition unless the mind is right. And one of the most potent things in breaking down the body and mind is worry. Now you know that the best definition of worry is "Fear." What should an honest, conscientious man fear? Nothing. But that is just the trouble with worry; it seizes on foolish little things that no normal, healthy man should fear. Face the situation squarely, if you are one of the worriers. Have it out with yourself. Then, when you impress upon yourself the foolishness and futility of worry, stop it at once, increasing your efficiency many fold thereby.

Now, after a thorough preparation for our work and having and keeping our minds and bodies right and in the best working order, what should we do further to develop our efficiency? It seems to me that study is the thing of most importance. It makes

**Value of
Continuous
Study.**

no difference how bright we are naturally, how well prepared we may be, how hard we studied or how high we stood in college, if we do not keep on studying after we enter practice. If we do not keep on studying we soon become stagnant. We must study to hold what we have as well as to acquire new. We should study text books as well as dental journals and new books of reference. Study along allied lines is also helpful in our work as well as being broadening in its effect.

Next in importance after study of current literature and text books I should put, attendance upon society meetings, and attendance upon society meetings is quite as truly study as the perusal of text books or magazines; indeed if you have to listen to papers like this it is about as hard and unpleasant study as you can engage in. But generally speaking, it is study in a pleasant, palatable and easily digestible form. Short papers, clinics, and most important of all, talks with the good fellows who usually frequent these meetings, all go to constitute study that is the most interesting, inspiring and lasting of all. And in this connection, let us not forget that one of the greatest benefits of study of any kind is to tell what we have learned to someone else. So if you are ever invited to read a paper or give a clinic, be sure to accept the invitation, because even if no one else gets much benefit out of your effort you will get a great deal yourself.

Another way to study is to visit the offices of other practitioners and with our eyes and ears open, absorb everything possible.

Now, after having learned things in these various ways, it is an essential part of efficiency to apply them to our own practice. We must carefully and thoughtfully go over what we read, hear and see, reject what we are sure we cannot use, try tentatively what we are doubtful about and adopt what we are sure we can use with benefit. This requires fine discrimination, but such discrimination comes with practice, and if we are humble enough to receive an idea wherever it may come from and honest enough with ourselves to carefully weigh it before adopting or rejecting it, we will soon develop a power of discrimination and assimilation that will increase our efficiency most markedly.

The enthusiasm we gain from study and association with our fellow practitioners increases our interest in, and love for our work, and certainly the word efficiency will never apply to a man who does not love his work.

All I have said of efficiency so far has related directly to the man himself, which, of course, is of first importance. But there are other things to be considered in connection with the efficiency of the dentist, viz., location, office and equipment. The location refers to the

town as well as to the place in the town. Some men will reach their highest efficiency in a city and others in the smaller places. Some fit the environment of one part of a city some another. So a man should know himself and place himself where he can work to best advantage.

Having decided on the location, we come to the office. Allowing for all differences due to the climate, size of the town, class of practice, temperament of the operator, etc., the office should be well lighted and ventilated, and as roomy and convenient as circumstances will allow. The reception room should be simply furnished, admitting of frequent and not too difficult cleanings. The operating room and laboratory should be arranged to best facilitate the work of the individual operator, and arrangement and rearrangement should be carefully thought out with the idea of increasing the operator's efficiency.

As the actual work on the patient must be done by the operator himself he must use every means to make each minute of his own time count to the greatest advantage. To that end an office girl or secretary should be employed as early in our practice as we can possibly arrange it. We should learn to let that person remove every possible burden from our shoulders.

As the practice increases we should arrange for an associate or laboratory man. If we have a genius for organization we may be able to build and maintain a practice for several men, dividing the work into specialties, thus increasing the efficiency of each individual as well as of the whole organization.

The equipment should be as carefully considered as the office, and whether it be furniture, instruments or appliances they should be bought if needed, but the need should be clearly demonstrated. To my mind it is quite as detrimental to efficiency to have a lot of useless stuff around the office as to have too little. Do not be afraid to say "No" to the over-persuasive salesman, and do not be afraid to invest in a thing after you have decided that you really need it.

The Business Aspect.

Last, but not least, is the business side of the practice. Each man must decide for himself as to the fees he will charge, but whatever they may be he should collect them. And they are never so easily collected as the minute they are due. Do not be afraid to be business-like about your practice. People respect you more for it. Moreover, you should not only be prompt in collections but you should exhibit the same promptness in paying the bills that you owe. It is most detrimental to your practice to be worrying about collections, and it is equally or even more detrimental to have people harassing you about your unpaid



Items of Interest

bills. So be methodical, prompt and business-like about your practice, as it will mean much for your efficiency.

But, you say, all this efficiency business is mighty hard on a fellow; it keeps the nose of the poor dentist right down on the grindstone; it means a life of sacrifice; it means hard work, constant work, without much chance for the so-called pleasures. I grant you that, but if one is to accomplish much in this world, constant endeavor is essential. But what pleasure is there so satisfying, so enthralling, so full of real joy, as that which comes with work, work well done, work that rounds out years of preparation and is the final accomplishment of a purpose? This is at once the pleasure and reward of Efficiency.





The Treatment of Pyorrhea from the Viewpoint of the Patient.

A general practitioner of dentistry, residing in Brooklyn, during the past twelve months has received two letters from patients dealing with their individual experience in the hands of pyorrhea specialists, which are so illuminating that they are herewith presented for the moral effect which they may have. The first letter, dated August 2, 1914, reads as follows:

"My dear Doctor:

Letter from Patient. "You will be interested to know that at last pyorrhea is claimed to be permanently cured. I have just taken the treatment given by Dr. V., of Paris, who guarantees that my gums are now absolutely healthy and free from all pus, and pockets will remain so.

"First, a culture was made from the pus by the doctor from the Pasteur Institute, and twice weekly for four weeks I received an injection of 'bugs' in progressive quantities, the last three being each two billions.

"Then twice a day for twenty-one days my roots were scraped and cleaned and the gums treated with various drugs until they finally were of that pale pink healthy hue that I never expected to have. It would pay you to have your assistant come over and get in touch with Dr. V. I met dentists from Milwaukee, Chicago and Philadelphia who knew and spoke highly of you, who were investigating at V.'s office this cure, and who marvelled at the success he had with my gums. They were en route to the International Dental Conference at London, which is to be held this week, and at which V. presents a paper on pyorrhea. I am inflicting this letter upon you because I am interested in you, and because I feel sure you will be interested in it. Hoping you are having a pleasant summer, and with my best regards to you and yours, believe me,

"Most sincerely yours."



It is evident from the above that this patient has been treated with an autogenous vaccine; that his gums had become more healthy and that he was delighted with results. He evidently considered that he had obtained such treatment in France as could not have been received in America, since he advises the practitioner to send his prophylactic assistant (who, by the way, is exceptionally skillful) to learn this method of cure.

The interesting feature of the treatment is its comprehensiveness. The patient not only received injections twice weekly for four weeks, but after that the roots were cleansed and scraped and various drugs applied to the gums *twice daily for twenty-one days*, till his gums had a healthy hue that the patient had never expected them to have. The natural query arises, was it the vaccine injections which effected the cure, or the forty-two sittings of cleaning and scraping, or the drug application? Or was the result dependent upon all these together? The writer confesses that he is confused, and finds it difficult to determine the due proportion of merit attributable to each part of the treatment. It is not worthy, however, that this case appears to have been cured without emetin.

(N. B.—Since sending the above to the printer, the writer has learned that this patient has presented recently with pus oozing around several teeth.)

The second patient, "treated in America," received quite as many kinds of treatment, but with less benefit, judging by his letter, which is as follows:

"*My dear Doctor:*

**Letter from
Another Patient.** "I have had so much work done on my teeth with apparently anything but beneficial results that I am writing you to give you a little history of my case, as it may possibly be some aid in treating me.

"Practically all of my teeth have ached for the past two or three years. There were no cavities. However, Dr. H., of Philadelphia, (dentist), thought that it was a gouty condition, and could probably be cured by removing the nerves and cleaning out any foreign deposits at the roots of the worst teeth; at the same time treating them with an electric battery. He also took some pus from the roots and made a serum and gave me a hypodermic injection every week for three or four

months. At the same time he had me drink about two quarts of water per day. These efforts may have helped, *but they did not cure.*

"Dr. H. was guided somewhat by Dr. S (physician), of Philadelphia, who had had me in the hospital for intestinal trouble. Both the dentist and the physician thought that my trouble with my teeth was due partly to my intestinal trouble.

"I later went to Dr. B (dentist), New York. He treated my teeth for three or four months with no results. He sent me to Dr. H. (claimed to be a pyorrhea specialist), New York, who, so far as I know, did me no good. Dr. B. then sent me to Dr. R. (physician), New York, who claims that my trouble with my teeth is all due to my intestines. I have been following his prescriptions and diet for nearly a year, perhaps with some good results.

"I am certain that the dentists wasted a great deal of good time filing and sawing at my teeth. They have filed them down to such an extent that they are practically smooth and greatly reduced in usefulness.

"Very truly yours."

What comment shall we make on this second letter, or upon both together? They are both written by intelligent, successful business men. In the first case the patient is delighted because he considers himself cured. Perhaps he is. Let us hope so! It is not to be overlooked, however, that despite his description of details of treatment, which assuredly was strenuous enough, not a word does he say about any home treatment which he must himself apply if his present state of health is to be maintained.

In the second letter, the real names of all the dental and medical men are widely known. They are all prominent men. Yet we find them all undertaking to treat a condition which they all individually and jointly have failed to control.

Elsewhere in this issue we make an appeal for a sane and sanitary method of bridgework. May we not ask the pyorrhea specialists likewise to arrive at some sane and scientific mode of treatment of pyorrhea? And in view of the systemic poisoning said to result from uncured pyorrhreal pockets, would it not be saner to extract the incurable teeth promptly? Of course, the extraction fee would be less, but is not such a letter as the above a serious arraignment of the dental profession? And does anyone doubt the accuracy of the picture drawn by this sufferer?



"HINDSIGHT IS BETTER than foresight," cried the man running away
◆ from a mad dog; but, "foresight is better than hindsight, by a good
◆ sight," said the girl crossing a bull pasture, as she removed her red
◆ sweater.



IT WAS ONLY A FEW YEARS ago when the dental profession of this
◆ country almost suffered mental rabies because attacked by Dr. Hunter,
◆ upon whom they looked with little less love than were he a mad dog
◆ indeed. Many truly believed that his accusation that American dentistry
◆ was septic dentistry, was an unwarranted diatribe against the work and
◆ workmanship of the dentists of the United States. When the truth was
◆ known, it became apparent that Dr. Hunter had used the term American
◆ dentistry, written thus: "American dentistry," and by it he meant that
◆ style of dentistry, mainly crown and bridgework, practiced by the
◆ Cheap-Johns of England and advertised to the confiding public as
◆ "American dentistry."



THUS IN TIME the excitement in this country died down. Dr. Hunter did
◆ not mean us after all. He meant "American dentistry" with quotation
◆ marks, not American dentists, the simon pure.



BUT A FEW of the more scientifically inclined and more thoughtful among
◆ us, did not find comfort quite so easily, and these men have practiced
◆ "hindsight" so thoroughly, using the all seeing X-ray to obtain the in-
◆ sight into the results of past efforts in crown and bridgework, and this
◆ hindsight has produced such appalling pictures, such evidence of septic
◆ conditions hidden under bridgework and crownwork admittedly "Made-
◆ in-America," that it has been more than proven that American dentistry
◆ (without the quotation marks) has been sadly at fault in the not distant
◆ part.

FROM THIS RETROSPECTION, has come introspection with the result-
◆ ant verdict that in the future American dentists, at home and abroad,
◆ must use more circumspection. From this hindsight is born the need
◆ of more foresight.



EVIDENCE ACCOMPANIED by radiographic proof of conditions was pre-
◆ sented in the July "Items of Interest" by Dr. Byron C. Darling, a medi-
◆ cal man practicing radiography as a specialty. But a more direct in-
◆ dictment was handed down in the August issue by Dr. Morris I. Scham-
◆ berg, a dental and medical graduate practicing oral surgery.



IN A RECENT PRIVATE conversation Dr. Schamberg was asked: "Grant-
◆ ding that serious systemic infectious diseases are frequently accompanied
◆ by septic conditions under and around crowns and bridges, what real
◆ proof is there that the oral condition was the primary cause of the dis-
◆ tant diseases?"



"MUCH REMAINS TO BE done to clear up this whole question," replied
◆ Dr. Schamberg, "but there is one significant fact which makes a tre-
◆ mendous impression upon the internist in hospital clinics. That is that,
◆ not occasionally, but frequently, serious body lesions resist every man-
◆ ner of treatment, and then when the oral infection is discovered and the
◆ teeth extracted or the mouth infection cured, the systemic symptoms
◆ disappear with magic-like rapidity."



IN THE SAME general strain is a letter from Dr. T. B. Heckert, of Wayne,
◆ Neb., from which the subjoined is quoted.



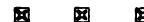
"I WONDER," writes Dr. Heckert, "If you would not discuss Around the
◆ Table this question: "Is it possible to make a really sanitary crown or
◆ bridge?"



"RECENT INVESTIGATION," he continues, "in regard to infections origin-
◆ ating in the mouth has caused a radical change in the opinions of many
◆ honest dentists as to the value of this class of work, even though none
◆ of us doubt its usefulness as an aid to mastication and for the restora-
◆ tion of broken-down teeth.



"IN NEARLY ALL DISCUSSIONS that I have heard upon this all impor-
◆ tant matter, the stand has been taken that it is only poorly made
◆ crowns and bridges that are unclean, but when we examine the work
◆ of honest and skilled men, after being in use for several years, we are
◆ tempted to believe that all crowns and bridges are unclean, the main
◆ difference being that some are more so than others.



"I BELIEVE WE ALL have been conscientious in the past in recommend-
◆ ing and constructing this class of work, but in the light of our present
◆ knowledge are we justified in continuing to do so?

"THE EVILS OF THE shell gold crown, so frequently used in the past to
♦ avoid a large operation, has been greatly minimized by the advent of
♦ the casting process. Now that we have the cast gold inlay, we can re-
♦ store single broken-down teeth with less labor and with better results
♦ for the patient.



"BUT FOR THE BRIDGE we have no substitute except the partial plate
♦ denture, with all the problems which that brings to us in the way of
♦ clasps. On the other hand if we abandon crowns altogether, we must
♦ also dispense with the removable bridgework which relies for itsreten-
♦ tion upon some form of attachment to the abutment teeth.



"WHILE THE OLD-FASHIONED partial plate is not so serviceable for
♦ mastication as the modern bridge piece it was at least possible to keep
♦ it clean and sanitary, and we cannot detect any unholly odors from such
♦ a piece when the patient is of reasonably cleanly habits. This, of course,
♦ is, in a less degree, true of removable bridgework, but it is not true at
♦ all of fixed bridgework, and fixed bridgework being less costly, is in
♦ more demand and in more general use than removable pieces, which
♦ latter require intricate and difficult attachments, if made successfully.



"I THINK THERE IS little doubt that the increased income which crown
♦ and bridgework has brought to the dentist, has had some influence in
♦ establishing it in its present popular place in dental practice, and for
♦ this reason much outside and inside pressure may be needed to bring
♦ about its abandonment.



"IT IS CERTAINLY a sad state of affairs when a supposedly learned pro-
♦ fession must be checked up by outside influences. We have been asking
♦ the medical profession to take more interest in dental practice, but when
♦ they do we find ourselves under grave suspicion of having promoted
♦ those very dangerous conditions which we have so loudly condemned.
♦ Has not the time arrived for a little self-examination?"



DR. HECKERT'S LETTER is a trumpet call in clarion tones. It is a call
♦ to the crown and bridgeworkers of this country to "clean house or
♦ move out." What will their answer be? I ask what will their answer
♦ be—because they must make reply. Ever since Hunter's articles on
♦ oral sepsis, a small band of devoted men have been attacking the serious
♦ problem of root canal treatment, and already such progress has been
♦ made that a more perfect root canal technique has been established
♦ which will continue to improve until the profession will have mastered
♦ this problem, quite as well as has any surgical procedure been standard-
♦ ized for any other part of the body. Aye! Even more so!



THE MOST DIFFICULT part of the bridgeworker's problem therefore is
♦ approaching solution, and in this particular part of his work his duty
♦ becomes obvious. Either he must master the technic of root treatment

- ❖ and filling, or else he must refer that part of the treatment to some other man, and only start the construction of his bridge, after the root specialist has finished making the abutment teeth free from infection and practically free from the danger of future infection.



IN THE PRESENCE of teeth affected by pyorrhea, the theory that loose

- ❖ teeth utilized for bridgework, will "tighten up," has been finally disproven. Such teeth do not regain health merely by the support rendered either by fixed or by removable bridges. Abutment teeth should be in a state of health prior to any attempt to use them as supports for bridges. If they be diseased therefore, the disease should be eradicated before the bridge is even planned. No other course is fair to the patient.



AS IN ROOT CANAL treatment, if the bridgeworker cannot cure the pyorrhea, he should refer his patient to a specialist for treatment before undertaking any bridgework.



BRIDGEWORK OF THE FUTURE must be sane and sanitary. It is never

- ❖ sane to attach bridgework to diseased teeth. This, at least, is a foundation principle that may be adopted at once. The problem of making bridgework sanitary is not unsolvable, and therefore the bridgeworkers must attack this problem and they must solve it.



GRANTING THAT bridgework should only be placed in healthy mouths

- ❖ and supported upon healthy teeth, there still looms up three grave aspects to the bridgeworker's problems.



BEGINNING WITH THE mouth and teeth in a state of health, how shall

- ❖ he construct and retain a bridge without danger of inducing a diseased condition? While utilizing teeth for the retention of his piece, the bridge itself should be so constructed that while the abutment teeth shall act as efficient retainers of the bridge, the bridge itself shall support the abutment teeth against all undue or unnatural stress, while at the same time allowing the abutments that movability which is essential to maintain the pericemental attachment in a state of health.
- ❖ Briefly put, either too much movement of a tooth in its socket, or too much rigidity, will induce disease through trauma.



SECONDLY, THE BRIDGEWORKER must decide whether or not to re-

- ❖ move pulps from healthy teeth, or use them with pulps alive. Where pulps are left in abutment teeth, the problems will be, whether the inlay, Carmichael collar, or clasp will not eventually induce disease of the pulp, death of the pulp, and infection of the periapical area. Teeth thus used in bridgework, without pulp removal, belong to that great class which "never gave any trouble afterward." No! The teeth do not give any trouble; but the infection occurring in the form of blind abscesses we are now told are contributing causes of arthritis and other serious sys-

Items of Interest

- ❖ temic lesions. Hence if we leave the pulp alive, the brideworker must
- ❖ be prepared to prove by radiographs two, three, or five years afterward,
- ❖ that his living pulps have not since died, and that his non-troubling
- ❖ teeth are not seeping poison into his patient's system.

■ ■ ■

WHERE THE BRIDGEWORKER decides upon pulp removal, he must re-

- ❖ member that just as soon as pulp removal is practiced, the door is opened
- ❖ for periapical infection. The operation therefore must be thorough, and
- ❖ it must be skilfully accomplished. The healthy periapical tissues must
- ❖ not be injured nor infected during the process; all pulp tissue must be
- ❖ removed, and all of the canal or canals so thoroughly and so aseptically
- ❖ filled that the danger of future infection should be reduced to the
- ❖ minimum.

■ ■ ■

THEN TOO IT SHOULD never be forgotten that a pulpless tooth is no

- ❖ longer in a state of full normal health and strength. The dentine of
- ❖ such teeth frequently in time lose vital resistance to stress and fracture
- ❖ more easily. Hence in the construction of the retaining attachment,
- ❖ while using the tooth to hold the attachment, the attachment itself
- ❖ should be so made as to protect the abutment tooth against fracture in
- ❖ the future.

■ ■ ■

THE ABOVE ARE the main problems and the chief aspect of the problems

- ❖ which confront the brideworkers of this country. In the very recent
- ❖ past we have heard little from these gentlemen save an occasional con-
- ❖ tribution to the purely mechanical construction of crowns and bridges.
- ❖ Will they now join forces, do a little research work and unite to es-
- ❖ tablish a sane and sanitary system of American bridgework, which shall
- ❖ be free from any possible criticism by pathologists or physiologists?

■ ■ ■

FOR THE HONOR OF AMERICAN dentistry this must be done, and we

- ❖ invite and will welcome discussions on this topic.





Samuel Smith Nones, D.D.S.

Dr. Samuel Smith Nones died of Bright's disease June 10, 1915, at Narbeth, Pa., and was buried at Wilmington, Del., on June 12th. Dr. Nones was born on Staten Island, N. Y., April 22, 1837, and therefore was 78 years of age at the time of his demise.

On January 15, 1863, Dr. Nones married Harriet Alexander Hodgson in Wilmington, Del., who died May 8, 1882. In 1885 he married Elizabeth Cooper, who died September 29, 1907.

Dr. Nones was graduated from the Pennsylvania Dental College in 1859. Practiced his profession in Wilmington, Del., till 1864, when he moved to Philadelphia, where he practiced till a few years prior to his death. He was one of the charter members of the Pennsylvania Dental Society.

Two sons, Drs. Robert H. Nones and Henry B. Nones, and a daughter, Mrs. Ida Wiley, by his first wife, and Albert C. Nones, by his second wife, survive him.

With his son, Robert H. Nones, and his grandson, Robert H. Nones, Jr., Dr. Samuel Smith Nones conducted his office under the probably unparalleled conditions of having three generations in practice together.

Eugene A. Johnson.

Whereas, It has pleased our God and Manager of all things to remove Eugene A. Johnson by death. The commonwealth has lost a worthy citizen of the highest type, and our profession an eminent and highly respected member, who throughout his career was ever among the foremost in working for the advancement of his fellowmen.

Dr. Johnson was an earnest worker for higher ideals in dentistry. He was an earnest and forceful teacher and was highly appreciated by his confrères in the faculty of the University of Tennessee College of Dentistry, with whom he had been associated for several years.



In all professional and society work his council and ability to perform were greatly appreciated. By his death the Memphis Dental Society feels that it has sustained an irreparable loss.

Therefore, we do resolve to give expression to our sorrow and feeling of loss caused by the sudden culmination of this brother's noble career. We also wish a copy of the above sent to the bereaved family and to the journals for publication.

J. D. TOWNER,
D. M. CATTELL,





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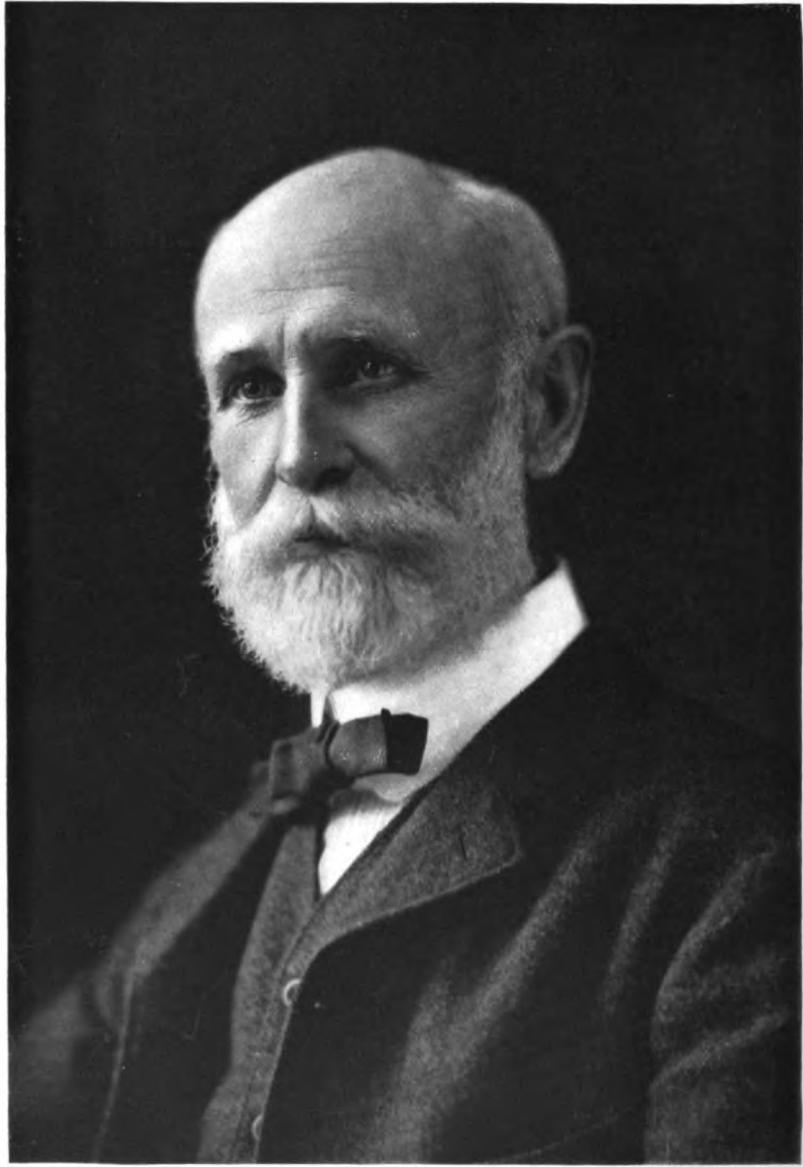
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CA



DR. GREENE VARDIMAN BLACK



Observations on the Relative Toxicity of Novocain and Cocain.

By J. M. LEVY AND ROBERT A. HATCHER.

From the Laboratory of Pharmacology of Cornell University Medical College.

The present investigation was undertaken as the result of the reported death of a patient who was said to have received a "small dose of novocain with suprarenin synthetic" and who died almost immediately, rolling off the table and showing marked opisthotonus. It was impossible to obtain a detailed report of this accident, but the correctness of the main facts were sufficiently attested to make it seem desirable to investigate the question of toxicity, inasmuch as novocain and suprarenin synthetics are used extensively in dental practice.

It is commonly stated that cocaine is from six to ten times as toxic as novocain. Biberfeld (*Med. Klinik*, 1905, No. 48) states that the toxicity of novocain is very slight (*aeusserst gering*) as compared with the toxicity of cocaine on cats, rabbits, dogs, rats and frogs, when administered subcutaneously or intravenously. He concludes that cocaine is about seven times as active as novocain, whatever the mode of application, and that one may accept clinical experience as showing that cocaine is ten times as toxic for man as novocain.

**Mode of
Injection
Important.**

Piquand and Dreyfus (*Journal de Phys. et Path. Generale*, 1910, No. 1) states that it is not easy to determine and compare the toxicity of various local anesthetics because of the concentration of the solution used, and the place and manner of injection

must be taken into consideration, as it is of extraordinary importance to determine how rapidly or slowly one is to inject the drugs.

They found that when they injected a solution containing 0.5 per cent. of novocain into the ear vein of a rabbit at the rate of 5 c.c. per minute, that 0.06 to 0.063 gm. x kg. was toxic. If this rate of injection was doubled, 0.042 gm. x kg. was toxic, but if the rate was slowed to one-half that first mentioned, the toxicity was diminished so that 0.9 gm. x kg. was required.

They concluded that novocain was only one-fourth as toxic as cocaine by intravenous injection, and one-sixth as toxic by intraperitoneal injection.

The literature concerning novocain is voluminous. A little volume, entitled "Klinische Berichte und wissenschaftliche Abhandlungen über Novocain," issued by the Farbwerke vorm. Meister Lucius & Brüning, contains references to some six hundred articles dealing with the subject, but these are mainly clinical.

In the present article we shall discuss the relative toxicity of novocain and cocaine, the probable causes of sudden death after the administration of moderate doses, and methods to be employed in combating such accidents without concerning ourselves with the relative anesthetic action of the two drugs, however important they may be to the pharmacologist and the dentist.

Further studies of the drug will probably be published later.

**Experiments
on Lower
Animals.** Cats, dogs and rabbits were used for the present series of experiments, the results being so similar with these species of animals that the later experiments were carried out on cats almost exclusively.

As dentists use novocain by subcutaneous injection almost exclusively in combination with epinephrin (suprarenin synthetic), an effort was made to determine the toxicity of combinations of these two drugs. Reference to the protocols shows that novocain is almost non-toxic to cats in all ordinary (and even in extraordinary) amounts when administered in this way. The reason for this will become apparent when the results of the intravenous injections are examined.

Tortoise Male Cat. Wt. 1.54 kg.

Experiment No. 10. 11:15—Subcutaneous injection of 92 mg. novocain x kg. in 1 c.c. per kg. epinephrin 1-5000.

1:07—Normal; has shown no symptoms.

2:00—Eats greedily.

Cat. Wt. 2.40 kg. Subcutaneous Injection.

Experiment No. 11. 2:48,40—Injection started, 100 mg. novocain
 x kg. 10% sol. in $2\frac{1}{2}$ c.c. epinephrin 1-1000.

2:48,50—Injection finished.

3:00—Apparently normal.

3:17—Apparently normal.

3:18—Eats ravenously.

The object desired when epinephrin is added to **Epinephrin.** novocain for subcutaneous injection is to lessen the rate of absorption into the general circulation and thereby prolong and intensify the local action on the sensory nerve endings, and possibly also to secure some synergistic action of epinephrin and novocain on the nerve endings.

The mere fact that it does retard the absorption of the novocain would lead one to expect that it would also lessen the toxicity of the latter so far as the systemic effects are concerned. The degree to which it will lessen this systemic action will depend, of course, upon its rate of elimination after it enters the blood stream.

The results of the experiments in which novocain alone was injected subcutaneously in amounts similar to those used with epinephrin show that the combined use of epinephrin does indeed lessen the systemic action to a notable degree, as shown by reference to the protocols of these experiments.

Female Cat. Wt. 1.24 kg.

Experiment No. 9. 11:02—92 mg. novocain x kg. in 10% sol. N. S.

11:13—Violent retching; nothing evacuated.

11:17—Violent retching; nothing evacuated, as before.

11:19—Muscular weakness; walks with trembling limbs and falls when made to jump from table to floor. Marked weakness in hind legs.

11:23—Cries—then retches—but stomach empty; no evacuate.

12:10—Some weakness in hind legs, but otherwise normal.

1:07—About normal.

2:00—Too nauseated to eat.

Male Tiger Cat. Wt. 1.96 kg. Subcutaneous

Experiment No. 12. injection.

2:41,28—Injection commenced, 100 mg. x kg.
 2 c.c. 10% sol. diluted with $\frac{1}{2}$ c.c. N. S. sol.

2:41,30—Injection completed.

2:42—Pulse normal.

2:48—Nausea and muscular relaxation.

2:55—Control of hind legs weakened.

2:57—Considerable lack of muscular co-ordination.

3:04—No change from above.

3:17—Nausea still continuing.

3:19—Will not notice food.

3:50—Eating, and approaching normal.

**Slow and Rapid
Injecting.**

The relatively slight toxicity of novocain for cats by subcutaneous injection suggested that the studies could be carried out much more conveniently by injecting the drug intravenously in such a way that the rates of injection could be controlled. These experiments are divided into two groups, which for convenience are designated as rapid and slow injections.

We are abundantly able to confirm the statement of Piquand and Dreyfuss with regard to the importance of the rate of injection in determining toxicity. This is a matter of importance with almost all drugs, but there are comparatively few in which it appears to play such an important rôle as in the case of the local anesthetics, and especially of novocain.

Reference to the protocols serves to show that while no healthy cat was killed with less than 40 mg. of novocain \times kg. of body weight (corresponding to about 40 grains for a human adult), the effects of as little as 20 mg. \times kg. of body weight (corresponding to 20 grains for a man) indicate that the sudden entrance of such a dose into the circulation would be extremely dangerous and might prove fatal.

Novocain, Toxicity, Cat. Female, wt. 1.74 kg.

Experiment No. 6. 11:33, 15—25 mg. novocain \times kg. in 5% saline, femoral vein.

11:33, 20—Heart stopped (because imperceptible to finger). Cat struggled for about two minutes and then soon became about normal.

11:48, 22—Injected 25 mg. novocain \times kg. as previously.

11:48, 27—Heart imperceptible, heart beat returning in about a minute, respiration becomes thoracic almost instantly, then interrupted.

11:50—Respiration and heart beat about normal. Symptoms about as previously.

12:32, 47—Injected 40 mg. \times kg. vein.

12:32, 52—Heart beat becomes imperceptible for about one minute.

12:34, 30—Heart beats irregularly, alternating, etc., sometimes rapid, sometimes slowly.

12:36, 15—Clonic convulsion, respiration mainly or wholly due to spasm of diaphragm, respiration soon ceases.

12:37—Heart beat perceptible only by carefully observing movement of hairs above it.

12:40—Heart has stopped beating, 2 minutes after cessation of respiration.

Rabbit. Wt. 2.06 kg.

Experiment No. 13. 2:15—Injected 20 mg. x kg. of 10% solution novocain in N. S., injected intravenously in ear vein.

2:15,07—Gradual stretching of limbs, followed by convulsions and falling on side.

2:15, 25—No respiration.

2:16—Respiration resumed.

2:17, 35—Able to get about, but stiffness in hindlegs, peculiar twitching, no reflexes.

2:18—Marked improvement, able to get about, but with some difficulty.

2:19—Getting about with some slowness, pain reflex present.

2:20—Movements slightly sluggish, but practically normal.

2:21—Entirely normal in appearance.

March 4, 1915. *Novocain Toxicity. Cat. Solution C*

Experiment No. 17. 1 (novocain 1-100 N. S.) Female tiger, wt. 2.3 kg. Ether for operation, exposure femoral.

11:30—Began injection (2.0 mg. novocain x kg. x min.)

12:30—Heart 180; respiration 38, irregular (about 120 mg. x kg. total).

12:45—150 mg. x kg., twitching about head and ears, respiration shallow, heart 180.

1:00—180 mg. x kg., some tendency toward convulsion apparent.

2:43—Risus sardonicus, twitching in head and ears; there has been some interruption of injection.

3:00—Cat has received 372.5 mg. x kg. of novocain and shows great depression. Interrupted injection for 20 minutes.

3:20—Injected rapidly 35.5 mg. novocain x kg. in about 1 c.c. N. S. Heart beat became imperceptible to the finger in about 11 seconds; convulsion, with rapid recovery of pulse and respiration; breathing was labored for several minutes.

3:24—General appearance about normal.

A few minutes later the cannula was removed, the vein tied, the wound sewed up and the cat released. The gait was disturbed for a time, as the cat had been tied in extended position for more than four hours. A little later it walked about normally and ate food within an hour.

March 5th. Animal appears normal.

Note that the animal received about 372 mg. x kg. by vein in four hours, and that within twenty minutes of the completion of that injection it had so far recovered its normal condition that the sudden injection of nearly the fatal dose had no greater effect than the same dose usually has on a normal animal. In other words, the cat was virtually normal within twenty minutes of the completion of injection of 372 mg. x kg.

Total amounted injected, 408 mg. x kg.

Male Cat, white. Wt. 1.96 kg. Solution D.

Experiment No. 7. Novocain 1-1005% phenol was applied to skin and vagi exposed and cut and femoral vein exposed. Some respiratory distress from mucus.

1:20 P. M.—40 mg. novocain x kg. in 5% sol. by vein. Heart stopped in about five seconds, and there was a few feeble beats at irregular intervals thereafter. Respiration ceased almost at once, and there was no further manifestation before death. Evidently the minimal fatal dose administered in this way affects the heart directly and the respiration almost equally. Symptoms described here vary somewhat in the different cases, but in general they were much alike, except in the intensity of the reaction. Evidently the stoppage of the heart is not due to vagus stimulation, as one would be inclined to suppose from the fact that the heart stops after the vagi have been cut and then begins to beat again.

We can also confirm the statement of Piquand and Dreyfuss relative to the greatly diminished toxicity of novocain with slower injections, but their results are far from indicating the real toxicity of the drug with a very slow administration.

Reference to the protocols of Experiment No. 17 shows that as much as 408 mg. of novocain per kg. of bodyweight (corresponding to a dose of 408 grains for a man) may be injected intravenously into a cat within a period of about four hours without causing death, and, indeed, without causing more than temporary injury, but we wish it distinctly understood that we do not say that even smaller doses might not be very injurious *indirectly* in ways that we have not determined. Our results apply only to the conditions of the experiments.

That the direct effects of the injections of such truly colossal doses of novocain on the heart and respiratory system are only fleeting is shown by the results of this experiment (17), in which an animal received almost the full fatal dose of novocain at a single injection after an interval of twenty minutes following the slow injection of 372.5 mg. x kg. of weight. This dose caused symptoms indistinguishable from those induced in those cats which had previously received no novocain—in other words, within twenty minutes after the injection of 372.5 mg. of

novocain x kg., the animal had become apparently normal, and behaved toward further injections of the drug exactly as a normal animal. This points conclusively to the rapid elimination of the drug or its fixation in the tissues in such a way that it no longer exerts its typical effects on the heart and respiratory system.

From the results of these experiments it is obvious that one cannot speak of the fatal dose of novocain for an animal without clearly defining the conditions of the experiment, since 20 mg. x kg. of weight may be distinctly dangerous and 400 mg. x kg. may be survived without apparent injury.

The toxicity of cocaine was not determined as accurately as that of novocain, but the experiments serve to show that this varies within narrower limits than that of novocain with the varying rates of administration.

Experiments with Cocaine. Reference to the protocols of experiments shows that as little as 15 mg. of novocain x kg. of bodyweight may prove fatal to a cat when the injection is rapid, and that as much as 40 mg. per kg. may be survived in some cases when the injection is made slowly. In one experiment (No. 28) a cat required no less than 83 mg. of cocaine hydrochlorate per kg. by the vein within a period of four hours and forty-four minutes to cause death. In this case it seemed almost certain that less cocaine than that injected would have proved ultimately fatal, hence our experiments do not determine the maximum and minimum toxicity of cocaine by different methods of administration, but it is also obvious that one cannot speak of a definite toxicity of cocaine without reference to the mode of administration, and it is possible to kill an animal with a dose of novocain administered rapidly by the vein which is smaller than the largest dose of cocaine that may be survived if administered slowly by the vein. It might be put somewhat differently, as follows: If equal amounts of cocaine and novocain are administered in such a way that the cocaine is absorbed very slowly and the novocain very promptly, death might follow from the novocain and no injury result from the cocaine.

Experiment No. 30. *Female Cat. Wt. 2.58 kg. March 18th.*

1:48, 30—15 mg. x kg. cocaine HCl in 10% sol.

1:48, 40—Convulsions, heart and respiration ceased.

1:48, 50—Respiration beginning again.

1:49—Heart beating feeble.

1:50—Gasping.

1:51—Death.

Résumé: 15 mg. x kg. at once fatal.

**Items of Interest**

Male Cat, tiger stripes. Wt. 2.52 kg.

Experiment No. 31. 1:21 P. M.—1 mg. cocaine HCl x kg. 1 per cent. femoral vein, no perceptible effect.

1:30—10 mg. cocaine HCl x kg. 1 per cent. femoral vein. Clonic convulsions, respiration irregular, embarrassed, heart slow and feeble.

1:35—Heart rapid, respiratory distress and clonic convulsions continue.

1:38—Convulsion (none afterward), heart and respiration becoming normal.

2:00—10 mg. x kg. as before. Opisthotonus, clonic convulsions, resp. distress; heart becoming imperceptible at once.

2:00, 30—Heart beats.

2:02, 30—Clonic convolution beginning in head, spreading to body.

2:20—10 mg. as previously; was normal; symptoms as before.

3:00—Nearly normal; wound closed; animal released; lies prone, unable to walk; fore and hind limbs laterally extended, indicative of extreme weakness; responds to calling.

Résumé: 30 mg. x kg. in 50 minutes; 31 mg. x kg. in one hour.

March 19th—Appears normal.

March 22d—Appears normal; 31 mg. x kg. not apparently injurious (?)

Male Cat, tiger stripes. Wt. 2.58 kg.

Experiment No. 32. 2:06 P. M.—2.5 mg. cocaine HCl x kg. in 1% sol. femoral. One deep respiration at once; and respiration interrupted for 10 seconds about 30 seconds after injection; heart rate about normal, but weak.

2:08, 15—Heart faster and stronger.

2:11—12.5 mg. cocaine x kg. (cat being normal), 10% sol. Heart and respiration stopped in about 20 seconds; heart resumes in 20 seconds and respiration in 40 seconds; twitching about face 90 seconds after injection; clonic convolution and opisthotonus after 2 minutes.

2:38—Appears normal.

2:39—12.5 mg. x kg. as before, respiration ceased at once. Heart rapid, weak, respiration returns in 45 seconds; clonic convolution after 1 minute; several times repeated.

2:45—Recovering.

3:06, 30—12.5 mg. x kg. as before, symptoms much as after previous dose; violent clonic convulsions for 5 minutes, when heart was rapid, weak and irregular.

3:30—Wound closed; animal released; violent clonic convulsions at once and less severe in next 15 minutes; cannot stand.

March 19th—Animal is hyperexcitable slightly; apparently very weak.

March 22d—Animal apparently normal, except that it does not take food or water, and has taken none since injection.

Résumé: $40 \text{ mg. } x \text{ kg.}$ in 1 hour of cocaine HCl vein, lasting nausea.

Of course, this is not understood as an argument that novocain is not less toxic than cocaine; it merely illustrates the necessity of controlling the rate of absorption in any case where either of these drugs is used for its local anesthetic action.

Our protocols show that in nearly every case the heart and respiration cease almost simultaneously, and even where they do not cease at the same time there is no reason to doubt that the heart and respiratory centres are affected to an almost equal degree. The actions on the heart and respiratory centres are independent, because they come on in about five seconds, that is, before any effects of circulatory disturbance could materially influence the respiratory centre, and before respiratory failure could influence the heart.

The nature of the toxic action of novocain makes it apparent that sudden death may result then from the cardiac or respiratory failure, and efforts were made to determine the best methods of combatting this accident.

Owing to the rapidity of the action it is obvious that any measures of relief must be instituted without loss of time; hence only those measures were considered which could be applied at once under the conditions obtaining in the offices of dentists.

Respiratory Failure. Respiratory failure obviously calls for artificial respiration, and every dentist who uses a local anesthetic should be familiar with the Schaeffer method of artificial respiration, and in case of respiratory failure, artificial respiration should be begun at once and conducted until spontaneous breathing begins.

Cardiac Failure. Cardiac failure is a more formidable condition, and the only method of combatting this accident that we can recommend, as the result of our experiments, is the injection of epinephrin directly into the heart. For this purpose a reliable specimen of epinephrin should be kept at hand and a small amount injected at once if the heart stops suddenly.

We have already stated that the heart and respiration ceased almost simultaneously in the cat, and one might be inclined to argue that it would be useless to carry on artificial respiration alone in case of accident in man,

So far as one can deduce from experiments on animals, moderate doses of novocain will not cause either cardiac or respiratory failure in perfectly normal man, but the fact that death does occasionally follow moderate doses would seem to indicate that in such cases the heart or the respiratory centre is not quite normal, and in that case the drug will probably exert its action on whichever of these two structures is abnormally susceptible, and there is no reason to suppose that in any given case both the heart and the respiratory centre will exhibit any such extraordinary susceptibility to the action of the drug; therefore, if we can maintain an artificial respiration or can stimulate the heart to maintain the circulation for a few minutes, in case of accident, the drug will be eliminated from the circulation and the patient can be restored.

Experiments with Epinephrin. The degree of antagonism between epinephrin and novocain is not great, but the protocols of Experiments 24, 25, 26 and 27 show that under its influence some animals survived at least 50 per cent. more than the normally fatal dose of novocain.

Novocain. Epinephrin Antagonism. Tiger and Experiment No. 24. white male. Wt. 2.59 kg. Ether to operate only. Cannula into femoral vein.

11:54, 05—Ep. 1-50,000 into femoral begun.

11:54, 35 to 11:55—50 mg. novocain x kg. in opposite femoral vein; respiration ceased at once and artificial respiration begun.

12:02—Artificial respiration stopped and diaphragmatic respiration begun, feebly at first, as usual.

12:03—Heart feeble and irregular.

12:04—Death.

Maltese Male. Wt. 3.38 kg. Ether anesthetic,

Experiment No. 25. tracheal, femoral and carotid (for b. p.).

1:58, 30 to 2:05, 30 Ep. 1-100,000 fem. vein, 22.5 c.c. total.

1:59, 30 to 2:00—50 mg. novocain x kg. vein (during injection of Ep.).

2:04—Artificial respiration for short time, then spontaneous respiration.

2:19, 30 to 2:24, 15—18.4 c.c. total ep. 1-100,000 injected femoral.

2:20—60 mg. novocain x kg. vein in 30 seconds in 10 per cent. sol. Respiration and heart stopped almost at once, cardiac massage and artificial respiration were begun. The spontaneous heart beats began in about 30 seconds.

2:36—Spontaneous respiration.



2:32, 30 to 2:37—Epinephrin injected, about 11 c.c. total

2:52, 49 to 2:53—40 mg. novocain x kg. in 10% solution by femoral; heart stopped almost at once, the respiration continuing about 10 seconds; heart resumed beating for 2 minutes and 30 seconds.

2:55, 40—Heart has stopped.

2:57, 40—Massage, artificial respiration and epinephrin ineffectual, being continued about 1 minute and 30 seconds.

Novocain Epinephrin—Antagonism of Toxicity.

Male Cat. Wt. 2.94 kg.

Experiment No. 26. 3:45 P. M.—0.33 mg. epinephrin x kg. by vein.

3:45, 10—60 mg. novocain x kg. by vein in 10% solution; heart stopped almost at once; convulsions in about 40 seconds.

3:46—Cardiac massage, few spontaneous beats.

3:52—Death.

Male Cat. Wt. 3.9 kg.

Experiment No. 27. 4:10, 20 P. M.—12 c.c. total epinephrin 1-50-000 by vein.

4:11, 50 to 4:11, 55—60 mg. novocain x kg. by vein. Heart and respiration stopped at once; convulsions. Artificial respiration and cardiac massage; recovery.

4:16—Clonic convolution.

4:33, 40—40 mg. novocain x kg. Heart stopped in 5 seconds, respiration ceased in about one minute.

4:34—Heart beats feebly.

4:35, 40—Occasional feeble diaphragmatic respiration.

4:36—Respiration ceased.

4:38, 40—Heart stopped.

This animal and the one used in Experiment No. 25 survived a dose of 60 mg. x kg. with epinephrin, artificial respiration and cardiac massage, and later succumbed to 40 mg. x kg., though experience shows that the interval sufficed for complete recovery from the effects of the first dose.

The value of artificial respiration does not require argument, but since the heart failed in every case when excessive doses of novocain were given to the normal cat, and since the respiratory centre was also restored in those cases where epinephrin and artificial respiration were employed, we are justified in supposing that artificial respiration played its rôle in such cases, even though the nature of the experiments prevented the testing of the effects of artificial respiration alone on the centre.

Since it is impossible to obtain animals suffering from cardiac dis-

**Items of Interest**

ease and respiratory disturbances such as man frequently suffers from it was decided to try the effect of novocain on cats in which the circulation and the respiration were disturbed somewhat from hydrated chloral, cats showing marked susceptibility to that drug.

Novocain Toxicity in Presence of Chloral Poisoning.

Black and white female cat. Wt. 1.54 kg.

Experiment No. 38. 3:23 P. M.—0.1 gm. hydrate chloral \times kg. vein. Immediate depression, followed by moderate narcosis.

3:36, 30—30 mg. novocain \times kg. vein, 10% solution; heart very slow in 15 seconds; respiration ceased 20 seconds after injection. Convulsion of head and forelegs; slight opisthotonus.

3:43—Gradual recovery, apparently normal. Put to death.

Novocain Toxicity in Chloral Poisoning, Cat.

Male Cat, tiger stripes. Wt. 3.12 kg.

Experiment No. 39. 11:47—0.2 gm. hydrated chloral \times kg. by stomach.

12:30—Deep narcosis.

1:25—Narcosis apparently not so deep.

1:45—Tied on board; roused somewhat.

1:47 to 4:05—106 mg. novocain \times kg. 1-200. Injection stopped.

No twitching, no urination, no change in respiration or palpable cardiac action during 2 hours and 8 minutes. Obviously, moderate narcosis with hydrated chloral does not invariably render the animal more susceptible to novocain.

Male Black Cat. Wt. 2.76 kg.

Experiment No. 39 A. 10:00 A. M.—0.2 gm. hydrated chloral \times kg. stomach, deeply narcotized. Carotid cannula inserted for b. p.

10:42—Normal tracing taken.

10:44—10 mg. novocain \times kg. femoral. Respiration interrupted for 20 seconds; slight rise followed by fall in b. p.

10:47—3.6 mg. novocain \times kg. rise of b. p. with cessation of respiration. The rise of b. p. was evidently asphyxial in origin.

10:48 to 11:07—Approximately similar doses repeated frequently with analogous effects in every case.

11:07—8 mg. novocain \times kg. Effects as previous, except greater fall in b. p., following a rise.

11:10—3.6 mg. novocain \times kg. Death. Cardiac and respiratory failure simultaneous. Massage ineffectual.

Résumé. 48.9 mg. Novocain \times kg. in 28 minutes, proved fatal.

Maltese Male. Wt. 2.94 kg.

Experiment No. 40.

10:00 A. M.—0.2 gm. hydrated chloral \times kg., deep narcosis operation, as in previous.

11:32—10 mg. novocain \times kg. vein; slight fall in b. p.; respiration interrupted for 10 seconds with slight asphyxial rise of b. p., followed by gradual cardiac and resp. failure.

11:35—Death. Artificial respiration and massage ineffectual.

The protocols of Experiments 39A and 40 show that hydrate i chloral does indeed markedly diminish the resistance to novocain, at least in some cases, and as little as 10 mg. of novocain per kg. may then prove fatal if thrown rapidly, directly into the circulation. The increased susceptibility of the respiratory centre is especially marked under these circumstances. The results of Experiments 38 and 39 show that the synergism between novocain and hydrated chloral is inconstant. It probably depends on the previous injury of the respiratory centre by chloral. This lends some support to the contention that sudden death following the administration of moderate doses of novocain or cocaine are probably attributable to some abnormal condition of the heart or respiratory centre, indicating the necessity for ascertaining the condition of those organs before using a local anesthetic.

Eastman Dental Dispensary.

The entire dental profession will share with their confrères in Rochester their great pleasure at learning that Mr. George Eastman, head of the Eastman Kodak Co., has promised to that city a dental dispensary similar to the Forsyth Dental Infirmary.

This announcement was made on July 20th, at the meeting of the Rochester Dental Society, the nature and terms of the gift being outlined in the following address made by Dr. Wm. W. Smith.

Address of Dr. Smith.

Through the generosity of George Eastman and the active interest of several prominent business men of this city, the Rochester Dental Society is about to realize an ambition which it has entertained for some years, and toward which it has been working steadily. Indeed, what has been done is far ahead of what any of the members of the Dental Society had dared to dream, for Rochester is to have a dental dispensary second to none in the country, and the only one of its kind except the Forsyth Dispensary in Boston.



The building will be three stories, of handsome design, and will cost about \$300,000, fully equipped and including land. It will be provided with every convenience for advanced dental study and the carrying on of educational and research work. There will be about twenty chairs with competent operators at the start, and room for more as the work progresses. Provision will be made for performing all operations in oral surgery, all surgical and other treatments of the nose and throat when the condition of these organs is associated with oral diseases. Orthodontic work will be a special feature, as it has come to be known that narrow and contracted jaws and irregular teeth are a serious handicap to the child. The correction of these abnormal conditions is very important.

**Laboratory
for Research.**

A fine research laboratory is to be provided, where special attention will be given for studying the causes and effects of diseases of the mouth and teeth. There will also be a radiograph laboratory for X-ray work, which work is becoming very important in diagnosing dental diseases, and provision will be made for the extraction of teeth by the use of anesthetics. A very complete and perfect system for sterilizing all dental instruments will also be installed.

A fine lecture room, constructed with special attention to its acoustic properties, and an amusement room will be attractive features of the structure. Here the children will be entertained, and under the guise of amusement they will be taught the necessity for cleanliness in the care of their teeth. There will be regular courses of lectures for the internes and members of the staff, and a training school will be established for women who are preparing to take up prophylactic work. In time, it is planned to send these women into the schools of the city to do this work and to instruct the children as to the necessity for taking care of the teeth, thus opening up a new field for young women. This institution will be an ideal place in which they may qualify for this service. In some of the Eastern cities this school work has become an important part of preventive philanthropy, and there are places where no contagious diseases have been communicated among the children who are under proper dental care.

**Site in Main
Street East.**

The building will be erected in Main Street East, near the corner of Alexander Street, on the vacant lot between the chapter house of the Theta Delta Chi Fraternity and the residence of Edward McSweeney. It will also have an opening on Kenilworth Terrace, made possible by the purchase of a house and lot at the northwest corner of the

street. Plans for the buildings have been prepared by Gordon & Madden, and it will be the most complete of its kind in the world.

For several months Mr. Eastman has been deeply interested in the subject of preventive dental work among children. He went as far as to visit the Forsyth Dispensary in Boston, one of the greatest institutions of its kind, and carefully studied its work, and the more he understood the scope of the work the more deeply interested he became. Then, after conference with William Bausche, who has always taken the keenest interest in this work, and a committee from the Rochester Dental Society, he made the proposition to the society that he would build and equip a dental dispensary at a cost of from \$250,000 to \$300,000, this conditioned upon the willingness of the city to furnish at least \$20,000 a year for five years, an amount sufficient to carry on the prophylactic work in the schools; that private citizens contribute \$10,000 a year for five years, and Mr. Eastman himself would contribute \$30,000 a year for five years. At the end of that time Mr. Eastman will furnish an endowment of \$750,000 if these conditions have been met and the work is being carried on satisfactorily. He will then have paid into this enterprise over one million dollars.

The work has been thoroughly outlined and every detail has been gone into with Mr. Eastman. **Superintendent to be Engaged.** A superintendent will be engaged very soon and a

search is already on for a man who will be perfectly competent from a professional standpoint and big enough as an executive to fill this position. The work will be under his supervision from the very start, much the same as the work of the public libraries was developed under a newly appointed superintendent.

The work of the Rochester Dental Society looking toward a dispensary has been intelligent and persistent. The necessity for a place to take care of the teeth of the worthy poor of the city, especially the children, was early recognized, and the first institution of its kind was established at the Rochester City Hospital by members of this society some twenty-eight years ago and continued for two years, then abandoned because of lack of support.

A few members, however, refused to be balked, and persisted in the feasibility of re-establishing such an institution. A committee was appointed, and, after serving several years, reported that Captain Lomb would advance a sum of money sufficient to equip a free dental dispensary, to be the property of the society. On receipt of this report the committee was empowered to secure accommodations with some of the hospitals, but none was able to offer quarters with a suitable light and other essentials. Through the courtesy of the Public Health Association

this dispensary was located in its rooms, the association furnishing rooms, heat and electricity free to the Dental Society. This dispensary has been in successful operation ever since.

Chartered by State Board. The sum of \$600 was tendered the society and was deemed sufficient, but through donations from local merchants, dental manufacturers and dealers, an equipment valued at \$1,200 was secured free from all indebtedness. A charter was obtained from the New York State Board of Charities, and the dispensary opened to the public on Washington's Birthday, February 22, 1905. It was kept open two afternoons each week, and twenty-four members alternated in attendance the first year. Captain Lomb then offered to pay the salary of one or more dentists who would be present each week day from 2 to 5 o'clock.

The Rochester Dental Society has been a pioneer in this work in this country. The first dental dispensary in any school in the United States was established in No. 14 School, in this city. Since that time the work has been taken up in the schools of many other cities, appropriating varying amounts from public funds for maintenance. Detroit has appropriated this year the sum of \$30,000. The splendid gift of William Bausch made possible a complete equipment for No. 26 School, and recently Albert E. May offered to establish a dispensary in No. 18. Other public-spirited citizens have made like offers, especially in the case of No. 9, but these offers have not been considered, owing to the completion of the present plans. It has been decided that more efficient work can be done in this central dispensary, but trained workers will be sent to the schools with portable outfits for doing hygienic work, who will train the children in the care of the mouth and teeth.

Encouraging to Society. It will be remembered by many that when the actor, William Hodge, was in this city some years ago, he offered to give \$1,000 to the charity which a committee should select as the most worthy. The committee reported in favor of the Dental Dispensary. This was another gift which helped to encourage those who were looking forward to the larger development of the work.

The dedication of the Forsyth Dental Infirmary, the work of which so impressed Mr. Eastman, took place last November and marked an epoch in dental history. At that time, Thomas Alexander Forsyth said:

"It has been my wish that the Infirmary should be as a home to the children, beautiful and cheerful, a protector of their health, a refuge in their pain. By making them healthier and happier, I hope it may make

them grow to be better citizens of our beloved Boston. If this is accomplished, as I believe it must be, with the co-operation of the dental profession, I shall feel that the gift has been well bestowed."

This is the idea that Mr. Eastman has in mind when he makes this princely gift to the children of Rochester, to the children who, for one reason or another, cannot meet the expense of expert dental work, many of whom suffer all through life because of neglect of their teeth.

Boston Dispensary Highly Prized. The Forsyth building is partly of marble, and has been beautified especially since it is a memorial to James Bennett and George Henry Forsyth, brothers of the two Forsyths who erected it. There are many in the city of Boston who are of the opinion that never in the history of the world has money been so wisely expended as in this philanthropy. It has proved to be an uplift to the dental profession and will advance its power for efficient service.

The Rochester Dental Dispensary will serve the same purpose, and will prove one of the most far-reaching philanthropies ever advanced in this city. The number of diseases which may be traced to the teeth is increasing. The whole life of a person may be wrecked by neglect of the teeth in early youth. We are coming to understand this truth more perfectly, and Rochester is taking its place as a pioneer in the advanced work of prevention which comes from a better understanding of the teeth and mouth. The names of the trustees interested in this enterprise will be published later.

Condition Fulfilled. Mr. Eastman's second provision that citizens contribute ten thousand dollars per year for five years has been more than provided for, as thirteen men have pledged themselves to give one thousand dollars each per year for five years, making a total of sixty-five thousand dollars. These men have been appointed by Mr. Eastman as trustees. Their names follow with those of a dentist and attorney: William Bausch, Albert E. May, Gustave Erbe, George H. Clark, Joseph Michaels, Thomas W. Finucane, Thomas B. Dunn, George W. Todd, Harper Sibley, Albert B. Eastwood, Frank A. Stecher, Edmund Lyon, Andrew J. Townson, Dr. Rudolph H. Hofheinz (elected by the Rochester Dental Society), James S. Havens, Attorney.



Urgent Appeal for a Special Dental Hospital Fund for the Relief of the Many Sufferers from Wounds of the Face and Jaws Sustained in this War.

By DR. R. ANEMA, D.D.S., Paris, France.

The terrible injuries to the face and jaws among the wounded in this war bring into evidence the usefulness of dental, orthodontic and oral surgeons. Medical hospitals, in the beginning somewhat reluctant to accept their services, became gradually more conscious of the aid that these members of the healing art can give. Of this they become conscious, perhaps too slowly, and if after twelve months of war, which throughout Europe has resulted in 6,490,000 wounded*, the help these men can produce is not in accordance with the need, it is not the fault of the special surgeons just referred to who vigorously try to make a breach in ruling traditions. An example of a certain lack of interest in the work of these men, by the directors of general hospitals, can be found in the words of a leading medical colleague who declared that it had been decided from the beginning that no jaw cases should be treated in his hospital. This lack of interest—it is said without any antagonism—finds its origin, no doubt, in a too special interest that the general practitioner of the healing art takes in his own work, but it nevertheless exists and must be taken into consideration. It is a fact that can astonish only those who have forgotten the heroic but vain efforts of Harris at Baltimore—doctor of medicine as well as a practitioner of dental surgery—to obtain the co-operation of the general medical profession, viz : the medical faculty of his city of that day (1839) for dental educational purposes.

The initiative of the American Institute of Dental Teachers to create "a fund to be given to the European Red Cross Dental Hospitals for the relief of wounded soldiers needing the services of dental and oral surgeons" represents an admirable movement by some of the most learned as well as practical men in the United States. *However, so far, no special Dental Hospital exists in Europe*, and this is a gap which our group wants to fill. Clinics, for lesions of the jaws, as a part of and attached to general hospitals or to dental schools, do exist, but so far no special hospital for dental and oral surgery.

According to moderate calculations, there are among French and Belgian soldiers alone, up to May 5th, fifty-five thousand, seven hundred

*Official statistics of the War Office up to May 5, 1915.

and seventy face and jaw cases (55,770).* Trench warfare, exposing as it does the heads, is the cause of this considerable number. Add to this that the largest number of jaw cases treated in one of the clinics just referred to, up to May 24th, in Paris, was 193, and we have three clinics of equivalent importance here, besides a few minor ones, as well as in the provinces, then one can form for one's self an opinion of the pressing need for special hospitals for dental and oral surgery.

To join our group of specialists, we have asked a surgeon, known for his ability in restorative surgery (skin and bone grafting), to aid us, and have been fortunate in receiving his acceptance. This is Professor Morestin, member of the medical faculty of Paris, and surgeon of the Paris Hospitals. Something we are sure his modesty wants to hide, but which we are proud to bring forward, is that he has recently been decorated for his services rendered in jaw cases. He is at the head of a special ward in the military hospital of "Val de Grâce," also of one in "Rothschild's Hospital." Both these wards are full. In a week he estimates that a special hospital of 200 beds for jaw lesions would be filled. Therefore, he is of the opinion that a hospital of 500 beds would be desirable. It will be seen that the sum we ask for at the end of this article is not exaggerated. Since the beginning of the war the greater part of Professor Morestin's time has been devoted to "cleaning operations." He cleans the faces and jaws of the wounded in his ward of bullets, shrapnel, pieces of shell, etc., to reduce fever and so prevent death from septicemia. *The restorative surgical, as well as the mecano-therapeutic facio-jaw work of numerous cases has yet to be done, now as well as after the war.* Knowing how much better results are obtained from quick treatment of jaw lesions than after a postponed treatment when wrong unions have taken place, the urgency of the realization of our efforts seems sufficiently obvious. This surgeon verbally says: "*The creation of a hospital for lesions of the jaws which are so frequent in this war seems likely to render great service.*" Cognizant of this truth we have taken the initiative to endeavor to establish such an institution. Our efforts have so far met with considerable encouragement. To ascertain the official attitude, our organizing committee asked an audience with the French Ministry of War, and was very favorably received.

*Number of wounded French and Belgian soldiers 715,000 (War Office May 5, 1915.) ; 13% of which, according to a report in the Paris Academy of Medicine, are head wounds, that is 92,950. 60% of this number, according to moderate calculations, are face and jaw wounds, that is 55,770. To this should be added the number of Germans wounded in the facial region, prisoners in France and English wounded of the same category as far as they are not sent to England.



To TOUCH THE HEART OF SOME GENEROUS DONOR.

Remarkable instance of the compensative force of nature: this man writes on a slate, not being able, of course, to talk, that he thinks himself fortunate not to have lost his eyesight. No heart so hard but that it must be touched by the sufferings these men have had to go through. It is up to you brethren across the ocean to help us and touch the hearts of those able to help. Europe will be grateful to you.

The use of a building was voluntarily offered. Also we were assured that we could have all the help required for laboratory work. This work will be done by workmen, at present soldiers, who will be ordered back from the front for our purpose.

The committee was requested to organize the hospital at once to receive the wounded. We shall be attached either directly to the French Army Red Cross Society or to one of the private Red Cross Societies. Other high officials have given moral support. We were received in special audience by the American Ambassador at Paris, who in a letter of sympathy speaks very favorably of the idea. However, in addition to this moral support, encouraging as it is, financial aid is necessary. Professional men are not rich, and in giving their daily services without remuneration they are giving about all they are able to; yet to lead the way financially we personally began to form a little fund, trusting in the ultimate co-operation of our brethren across the ocean. Together with an organizing committee of professional men, a financial committee, consisting exclusively of business men, has been formed, to be in accord with the French law on philanthropic institutions. *About twenty thousand dollars (\$20,000) is necessary to start a hospital of one hundred beds and run it for six months.* It does not seem a large amount when compared with the prestige that the profession at large, and especially the American profession, will derive from it. It is also our intention to invite colleagues, representative of the different specialties of the healing art above mentioned across the ocean, to come and help us.

Our urgent appeal now is this: *Could not every dental and oral surgeon and orthodontist, or any other member of the healing art in the United States, ask one or two of his most devoted patients to give him some money for this hospital? Donations, large or small, will be gratefully received by any member of our group, or may be sent to Messrs. J. P. Morgan & Co., Bankers, Wall Street, New York; to Messrs. Morgan, Harjes & Co., Bankers, 31 Boulevard Haussmann, Paris, as well as direct to our treasurer, Mr. Ch. Van Enter, 21 rue du Dragon, Paris.* The donations will be acknowledged in this journal with the names of the practitioner and his patient, in addition to which a proper receipt, engraved by a French artist, will be sent to each donor.

N. B.—All donations should be designated "*For the American Dental Hospital of Paris for wounds of the face and jaws.*"

Members of our group: William J. Younger, M.D.; John H. Spaulding, D.D.S.; I. B. Davenport, M.D., M.D.S.; H. Morestin, M.D.; J. F. André Bonnet, Ch.D.; Frank W. Williams, D.D.S.; F. J. Wilson, D.D.S.; R. Anema, D.D.S., Secretary.



The Problem of Root Canal Treatment.

By FREDERICK W. FRAHM, Ph.G.; D.D.S.

Professor of Dental Anatomy, Operative and Prosthetic Technics, Colorado College of Dental Surgery, Denver Colo.

"What shall we reply?" is the question raised by Dr. R Ottolengui to "The greatest problem of the day in dentistry," this problem being, How shall we take care of our root canal cases to avoid both local and systemic trouble that frequently follow our efforts in cleansing and filling them?

This question, of course, is an old one, and has been settled in the minds of a good many men to their entire satisfaction. Be that as it may, I think that a large proportion of men really have never looked this problem squarely in the face. I wonder if fear in the heart of many a practitioner has kept him from taking radiographic observations, recording them, and giving the profession the benefit of his report! The usual course seems to be that of allowing the defects in the work to remain buried in the alveolar process as long as they will remain there with no apparent discomfort to the patient.

As has been observed in recent reports on certain systemic diseases, these seemingly comfortable roots of pulpless teeth are a menace to the patient's general health and well-being. We must remember, however, that it has not been established beyond a reasonable doubt that these remote conditions are the direct outcome of these local foci of infection. Many shadows lurk around this supposed positive diagnosis based upon the radiograph of the teeth and associate parts.

**Diagnosis with
Radiographs
Doubtful.**

The writer has used the Röentgen rays since 1904 for their diagnostic value, and does not feel prepared to positively state upon examining a radiograph that a given condition prevails, or that certain pathological lesions are present. There is too much

of an element of doubt surrounding such a diagnosis, and I would not be willing even to extract only one tooth on the simple findings of a radiograph. So many times we make two or more exposures of the case, develop the films under the same conditions in the same developer, and fix them in the same fixing and clearing solution, and with quite different results for some reason or other. This may be due to faulty technic in the dark room; the film gelatine may not be uniform; and last, but not least, the tube does not always work the same. Many other

factors would have to be accounted for before we could say, "We have made a positive diagnosis, one on which we would be willing to prescribe that a certain one or number of teeth shall be consigned to the forceps."

For a physician to state after the study of a radiograph that certain teeth are the cause of the arthritis or rheumatism, as the case may be, is ill advised. In February, 1911, the writer was attacked by a siege of arthritis, the infection of which entered his body by way of the tonsils after a severe exposure to wet and cold. I have never suffered from an abscess before, nor since this attack. Should I have all of my teeth extracted to render myself immune to the second attack?

While practicing in Pella, Iowa, a young woman twenty-two years of age came to my office to see why her maxillary plate would no longer stay up. She had worn it with satisfaction for three years. Upon investigation it was found that both of the maxillary third molars were erupting. She told me that her teeth had never been good, and had been extracted by her physician as soon as they had ached. This kind of practice did not disturb her in the least, for her mother had worn plates at the age of twenty. I removed these two teeth, at the time rendering her absolutely toothless. This patient a year later suffered an attack of arthritis of a severe type involving her heart. She recovered in six weeks.

The point I want to make is this: I do not think the medical fraternity has any right to make the dentist its "scape-goat" because of an inability to recognize the etiology of certain diseases. The Röentgen ray is a very valuable diagnostic agent, but has its limitations, and should not by any means be considered final.

But we must admit that there is room for improvement in our root canal technic, that there are a large number of teeth with one or more poorly filled root canals, and some with no fillings at all. Such a condition should not exist, since with a proper technic many of these supposed unfillable canals can be filled.

Mummification. At our last State meeting, while in conversation with a prominent dentist from a neighboring city, we were discussing this problem. I was very much surprised when he told me that he had not filled a canal for the last seven or eight years, and never even made an attempt to cleanse them, and is so well pleased with the results that he has abandoned this trying and difficult problem; mummification of the pulp being his technic, for he is an ardent follower of Dr. Söderberg and his methods. We cannot find language strong enough to denounce such a procedure, having been permitted on several occasions to see the evils that follow in the wake of this method. By all means remove every vestige of pulp tissue and replace it with a good canal filling.



**Instrumentation
in Root Canals.**

The question arises, "How shall these canals be opened to make possible a perfect canal filling?"

Dr. Otto E. Inglis, in his chapter on root canals in the *American Text Book on Operative Dentistry*,

gives a detailed discussion on the use of various canal reamers and drills in the opening of difficult canals, devoting part of the chapter to the patching up of perforations caused by the use of these instruments. He just mentions the fact that we may use chemical means for these cases, but gives no technic.

Dr. C. N. Johnson, in his work on *Operative Dentistry*, says very little on this most difficult and important operation.

Dr. G. V. Black, in his *Operative Dentistry*, takes up only those cases that do not require any special attention, and says nothing about the small curved canals. So we do not get any technic from him to offer the student in those cases that demand a little more than ordinary skill.

Drs. Max and Leo Greenbaum, of Philadelphia, and Dr. Bennet, of London, Eng., discuss Dr. Calahan's method of using reamers and 40 per cent. sulphuric acid in those difficult cases.

I might go on and quote many other authors which would only multiply the foregoing statement as set forth in the books cited. By far the larger per cent. of practitioners of this day advocate and use reamers and drills for opening the canals that submit with more or less ease, going as far as they can with such instruments.

Could it be possible that this procedure is to blame for so much of the septic conditions present around the apical portion of so many dead teeth? Since this sort of technic seems to be the only one that is set forth in the leading text-books used by colleges, and relied upon as authority for the student to follow, what can we expect from the profession at large when the new recruits get that kind of teaching? I am aware of the fact that there are teachers here and there who will supplement these teachings by their personal views and experiences. Still we have to let the student build on the text, even though we know that this technic will bring only from 20 to 40 per cent. results, and that only under the most favorable conditions.

The writer thinks and is convinced that drills and reamers such as are on the market to-day should be given very small consideration in the opening of root canals. That chemical methods, 50 to 75 per cent. sulphuric acid and the alloy of sodium-potassium, should be largely relied upon; in fact, I would go so far as to say that all canals requiring enlargement should be treated with the acid or the alloy. This may take a few more sittings and a little more of our time; nevertheless, it will be

time well spent, and we will have the satisfaction of knowing we have done our best, which in 90 per cent. of the cases will mean success.

I have found that the canal reamers such as are used to-day will, when introduced into a canal that is more or less curved during rotation, cut in two places: namely, at the side where lateral strain comes on the reamer due to the curve in the canal and at the point of the reamer, this

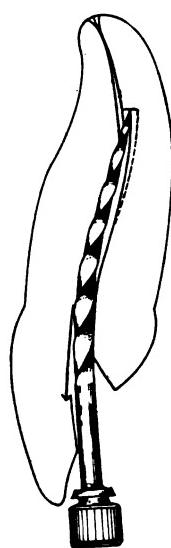


Fig. 1.



Fig. 2.



Fig. 3.

being due to the spring tension of the instrument (Fig. 1) The lateral cutting, of course, is not objectionable, being really desirable, but the point of the instrument is cutting out a ledge or shelf on the tension side which will prevent us from entering the canal beyond this point, leaving what pulp tissue or septic matter may be beyond this point. This canal when filled will become a menace to the patient and may be a source of systemic trouble.

**Broken
Instruments
in Canals.**

I was told while in college that canal drills made fine root canal fillings, though somewhat expensive. I can remember the day when I broke one of them in a mesia. canal of first mandibular molar of a young lady, and the weeks that I spent in caring for



this tooth, trying to rust it out with iodine. I can also remember that during the same year I perforated a lateral root by the same technic. This last patient had to have the tooth extracted. I dare say, if we made our confessions of the roots thus injured, and these facts were recorded, the figures would be appalling and might act as a stimulus to bring about a better technic in the care of root canals.

I owe a great deal to Dr. Frank B. James, of

Sulphuric Acid Treatment. Iowa, in whose office I spent the first year after receiving my degree. Through him I learned the

technic of the use of sulphuric acid in canal work and the abandoning of the use of arsenical preparations for devitalizing. I adopted this technic and have faithfully followed it in all cases with very gratifying results. Not all, but a large number of these cases were checked up with the Röentgen ray, this being done as follows: When the canals are cleansed, or we thought they were, the fine end of a smooth broach or a tapered copper wire was then introduced to the apex, allowing these to extend into or beyond the cavity to enable us to remove them. With these in position, while the radiograph is being made, there will be no question as to how far your work has been carried, or the kind of canals we will have to fill. If this radiograph showed satisfactory results, the canals were dried and properly filled.

With the rubber dam in position without a leak

Technic for Filling Canals. of any kind, the pulp chamber is opened and the one large canal is cleansed with barbed instruments

of proper size. This is usually very easily done in the case of the palatal canal of the maxillary molars and the distal canal of the mandibular molars. If it is found after investigation that the buccal canals of the maxillary and the mesial canals of the mandibular teeth cannot be taken care of with the barbed instrument, they must be enlarged. If the two foregoing canals are large, they should be filled and the opening of them in the floor of the pulp chamber sealed with wax, so that the acid will not penetrate where we do not need it. Then locate the openings to the other canals and enlarge them slightly so as to make them funnel-shape; then introduce a smooth tapering broach made from iridio-platinum (Fig. 2) as far as it will go, and leave it there as a guide for the acid.

I prefer these to the steel variety, for they are not affected by the acids and are much tougher. I would not advise the use of barbed instruments in this technic, there being too much danger of their breaking. Then with one of the loop instruments (Fig. 3) pick up the desired drop of acid (50 to 75 per cent.), carrying it to the place where the smooth broach enters the floor of the chamber; then by a pumping motion of

the smooth broach we work the acid up as far as we can, supplying more acid from time to time until we gain the desired goal, the apex. Unless there is a turn in the canal almost at a right angle we will experience very little trouble, and we can keep this up till we get the canal as large as we need. Sometimes this may require a number of sittings. When you are following the case up it will not be necessary to neutralize the acid at each sitting.

When the desired size of canal has been reached, the acid should be neutralized with a saturated solution of sodium bicarbonate. The liberation of carbonic acid gas that is formed by the chemical action will carry away with it all the detritis present in the canal.

The carbonizing effect of the acid on the canal contents, their walls and for a small depth into the tubuli of the dentine is very desirable, rendering the field practically immune to bacterial action, and will be a long step toward the abolition of small blind abscesses.

Is it worth while? This question has been asked many times after taking into account the time required to do this work. I will ask a question after taking into account the patient's ability to pay, and looking well after the professional, legal and mercenary side: "Can we afford to do any less?"





American Society of Orthodontists.

Discussion on the Paper of Dr. Grieves.*

Dr. Herbert H. Pullen, Buffalo. I consider it a great privilege to open the discussion on such a comprehensive scientific paper as has been offered by the essayist, even though I am unable to present a scientific discussion of the subject matter. At least, I can express my appreciation of the value and importance of this paper to our society, and our deep obligation to the author for its elaborate composition and presentation.

I had long contended that the success of our treatment in orthodontia is based primarily on our understanding of the etiological factors involved in arrested or perverted development in the dental arches. The successful use of vaccines in medicine owes its inception to what was called the germ theory, and by the isolation of the particular bacterium causing such a disease as diphtheria; the later discovery and production of a preventive antitoxin refers directly back to the etiological factors involved.

In our reiteration and investigation of etiological factors in malocclusion we have stumbled upon the idea that these conditions were but local symptoms of deeper seated pathological disturbances none too soon, not to be taken too much by surprise by these newer etiological factors included in the essay.

Malocclusion itself we really recognize as a symptom of a deeper pathological disturbance than lack of occlusal function.

*Dr. Grieves' paper appeared in September number.—ED.

Normal occlusion is an impossibility unless the internal secretory organs are synchronizing all of the time during growth of the internal and external face, if we accept the theory of the extent of their influence. Normal occlusion is located on a mechanical function controlled absolutely by the growth-controlling forces of these ductless glands, and is a terminal function largely, although correlated through use and misuse, with growth or lack of it in the internal face.

I am exceedingly glad to have a theory on etiology presented which will conform to or link harmoniously with the orthodontist's idea of arrested or deficient development associated with or preceding occlusion of the teeth.

If we can accept the essayist's conclusions that the lack of breast feeding of infants and the lack of human activation in cows' milk predisposes to arrest of development of the dental arches and to consequent malocclusion, then we may sometime be forced to begin early treatment of malocclusion at the time of childbirth, so to speak, by supplying the activators or other nutritive elements necessary for normal growth of the infant. Perhaps the future orthodontist will succeed to the physician's mantle, carry activator tablets, calcic salts, and developmental powders; and make house to house calls, dispensing normal occlusion in triturated tablets.

I think this splendid paper furnishes the most conclusive evidence of the deeply rooted relation that orthodontia bears to general medicine and of the necessity for the teachings of more than the fundamentals in medicine to the future student of orthodontia.

How many of us ever dreamed that the physiological chemistry of college days which we passed by as a non-essential in the study of dentistry would one day hold first place in the laboratory research work in the search for causes of malocclusion. Did we ever dream that the once unknown internal secretory organs which we at one time thought too insignificant to study would one day array themselves in sequence and synchronism as organs absolutely necessary to life and controlling bodily growth, nutrition and metabolism?

If the comprehensive fabric of etiological material which the essayist has presented can be made to hold together as a plausible theory, even with only an occasional demonstrable fact, our own efforts at etiological investigation will appear but dim scratches on the surface of a vast fund of knowledge which appears to be unfolding before us.

Let us at once be imbued with the idea that the cycle of synchronism of the internal secretory organs is seriously impaired by the infectious diseases of childhood, such as scarlet fever, measles, chicken-pox, whoop-

ing cough, etc., and we will make greater efforts at isolation and prevention of these diseases. If by these studies of the internal secretory organs a correlation between the development of the dental and maxillary arches and the stimulation of the pituitary body to normal functioning is proven to exist, our own rather crudely expressed and unsupported theories regarding the influence of orthodontic treatment upon these growth-controlling organs will have been established on a more elaborate foundation of fact.

As Cushing says, "There are few subjects in medicine which promise a wider overlap upon the fields of many special workers than this one of hypophyseal or pituitary disease. From the direct implication of the optic nerves by the glandular enlargement, the ophthalmologist has often been the first to recognize these maladies. The neurologist's interest was early aroused through the pressure disturbances on the part of the encephalon, and will be reawakened in view of the possible relations of epilepsy to glandular insufficiency."

"Specialists, whose activities are as divergent as are those of the actinographer and the physiological chemist, are now called upon, not only to aid in the matter of diagnosis, but it lies in their province to add materially to our further knowledge of the subject. And, needless to say, to the operating specialist in nose and throat maladies the subject is of prime importance, not only because the hypophysis itself abuts on his preserves, but for the special reason that there exists a pharyngeal organ which may possibly be a not infrequent seat of disease and which may possess some physiological properties of importance to the organism."

The essayist has struck the keynote in the relation of these various internal secretions to developmental conditions when he says: "The significance of all of the foregoing (referring to all of the ductless glands, their secretions and pathological effects in disease) to the dentist is that he should differentiate acromegaly, from mandibular protrusion from other causes, and be able to recognize the tipping forward of the anterior teeth and increase in the dental spaces, and the orthodontist should bear in mind, no matter what his theory, from the numerous cases showing improvement in the pituitary syndrome, that it may yet be possible to relieve some of the symptoms by spreading the arches, possibly by drainage of the ethmoidal and sphenoidal sinuses, relief of lymph blocking or of the circulation, etc. In other words, the dentist and the orthodontist must enlarge the scope of their vision as to etiological factors and their internal and external pathological expression. Otherwise we are treating symptoms alone without the knowledge of the causative factors, which point the way even indirectly to the more scientific treatment of malocclusion.

**Bottle Feeding;
Organotherapy.**

We must recognize our limitations in diagnosis and treatment and call in the trained specialist in other lines to assist us in diagnosis from a consideration of all of the etiological factors involved. If organotherapy will some time be depended on to stimulate normal function of the internal secretory organs and secondarily function and growth of the dental arches and internal sinuses; if bottle feeding is so serious a matter in its lack of supply of activators to development of the ductless glands, then it is up to the orthodontist to fall in line with the theory and at least understand the therapy of supplying artificial activators, so as to be able to give intelligent advice to parents.

As to organotherapy, in all probability after it has been experimented with until its possibilities are better known, it will be of assistance in constitutional treatment during the treatment of malocclusion.

The extent of the various phases of internal secretion, and the voluminosity of the subject matter of the paper in all its relation to orthodontia are so great that again I must regret that it has been impossible for me to have read one-tenth of the authorities mentioned in the text since receiving the paper, and even if I had I would still be unable to discuss scientifically this contribution as I should like to do.

I shall be interested in a further study of the paper, as I feel that it is one of the most valuable ever presented to this society.

I think most of us who have listened to this paper by Dr. Grieves are reminded how he covered the subject of the therapeutic action of metals some years ago when he won honorary membership in this society. You will remember how well he investigated that subject and how his results have practically never been questioned since.

He has clearly and exhaustively presented a tentative hypothesis for the explanation of some of the etiological problems we have encountered in malocclusion. I am sure that a common orthodontist like myself could not be expected to go into the details of this hypothesis in a critical way. The value that we shall realize in the presentation of this paper is to see how nearly his hypothesis squares to the facts of treatment retention as we see them in every-day practice. While some years ago we considered adenoids and diseased tonsils as causes of malocclusion, I think practically all men of experience have come to regard them as simply associated conditions. If we go on further we unconsciously realize that there is some condition back of the adenoids, and that Dr. Grieves has probably presented in his paper the true nature of those conditions.

Again, his hypothesis agrees with our prognosis. It explains why in so many cases we do not get complete success. There is that lack of tone in the bone which interferes with the final establishment of proper function. To verify this hypothesis we naturally and properly go back to the conditions existing among primitive people, and he suggested to me when he asked me to discuss his paper that I consider that phase of the subject.

**Deduction from
Examination
of Skulls.**

In the National Museum at Washington there are something like 300 skulls of children under twelve. It is quite a remarkable collection, probably the best in the world. While we find thousands of skulls in the museums, it is difficult to find those of children, and these have all been collected and kept together. They consist of the skulls of Indians, Mexicans and Esquimaux. In examining these skulls, I collected first those under five years of age. I found in the number I examined (about eighty) that there were seventeen under six years of age. If we consider the question as to how much these children were under-developed at that age, and the only standard of development we have is the Bonwill arch, corrected to correspond with the size of the teeth; if we take, not the extreme that we see in our human dentition, but the average, we find that the width across the second deciduous molars from what we call the occlusal line, that is, passing through the crest of the buccal cusps of the second molars, there is a variation of from forty-five to fifty millimeters. That is what would be the normal average. Of these seventeen, the average Indian child measured forty-five millimeters. You see there is something under normal there, but not greatly so; probably from two to three millimeters under what could be called normal. I went through the cases in my own cabinet and found models of eleven cases of children under five. These average thirty-eight millimeters. While the Indian child is slightly under normal at this age, our American child is greatly so, that is, from seen to eight millimeters under normal.

I found there fifty-one cases of children six years of age and eleven or twelve, and these were practically all normal; that is, the average width across the occlusal line in the region of the first permanent molar is from fifty-one to fifty-five millimeters, and the average in these fifty-one cases of Indian children was fifty-two and one-half. We can say they were practically all normal. With the variation that you would expect from the size of the teeth and the type of the individual, possibly they were exactly normal.

Taking thirty cases from my own collection of white children I found an average of forty-seven millimeters, about five and a half milli-

meters less than in the average Indian child. To corroborate Dr. Hrdlicka's observations and those of the essayist, all of our white children are under normal. The statement has been made constantly that our white children present the picture of arrested growth. There is not what we would expect, namely, a natural growth from a child of four or five to nine or ten. In the Indian children there seems to be a greater growth up to the age of four or five than in the white children, and from that time on, after the eruption of the first molars, while the white child stands still, the Indian child grows and becomes normal. He grows up to what we call a normal arch. There is no evidence whatever in these skulls of malocclusion, or of adenoids or protruded teeth. There are none of these types. They are somewhat difficult to judge, because in almost every case the incisal teeth are lost on account of the conical roots.

I would like to ask Dr. Hawley whether he has

A Member. made any investigation of negroes. In my State there are more of them than there are in New York and other places. I would like to ask him whether he has ever examined the skulls of negro children?

Not accurately at all. I have observed a good many, but have not made critical examinations.

Dr. Hawley. The modern negro, so far as casual observations go, is almost in the condition of the white child. I asked the Dean of the colored dental school in Washington as to his clinical work in orthodontia and the condition the colored children presented, and he said they are beginning to find as much malocclusion in the negro children as in the white; but where they go back to the primitive negro there is very little malocclusion.

Dr. Ottolengui. There is less malocclusion in the negro of the South than in the negro of the North?

Dr. Hawley. Very much so.

Dr. Grieves. Dr. Hrdlicka says the negro is almost generally rachitic, that is, he has rickets in some form. Of course, that would affect his occlusion.

Dr. Hawley. The negro in modern civilization presents a very different picture from the negro back two generations. He is afflicted with disease and decay of the teeth and malocclusion, yet there is evidence of normal primitive conditions.

In discussing this subject with Dr. Hrdlicka I find that he is very emphatic in his opinion as to the value of breast feeding in Indian children. Also, the Indian child is given as soon as he wants it any hard food. He is given green apples and other hard food. Anything the



child wants to chew he chews. It does not seem to hurt him. If we should give a white child green apples, or anything it wants to chew, we would expect it to die. The Indian child does not die from eating such food. If we would take the evidence presented it would almost corroborate Dr. Grieves' opinion that there is, in the first place, a greater activation of growth in the skull up to four or five years of age. Then we come to the function of the teeth, and the Indian child at an early age subjects the teeth to severe use. You find all the temporary molars with the cusps worn off, and some of them worn half way down to the sockets, showing the severe use to which they had been subjected. It seems to me, we are going to get a new hold on this proposition, and probably we may finally have some suggestions to make in regard to the diet of children that will be extremely valuable.

I do not presume to rise to discuss this very carefully prepared scientific paper, but I would like to ask for some information. The diagnosis of some of the cases cited by Dr. Grieves is more than I can understand, and in this connection I want to relate briefly a case.

A year or so ago there was brought into my office a patient presenting normal occlusion on the left side, but on the right side the teeth were fully one-half inch apart. From a superficial examination from the facial expression I came to the conclusion that the ramus on the right side was much longer than the ramus on the left side. I could find no evidence of early dislocation or of fracture. I advised that an X-ray be taken, and I have skiographs of the condition. I would like to ask Dr. Grieves his opinion as to whether he thinks the pituitary body frequently has an influence over these conditions in causing a slow development of bone tissue. There has been over-development of bone tissue in the ramus of the right side, and I understood him to say that on removal of the pituitary body there follows a diminution of bone tissue.

Dr. Grieves. That is what somebody else said.
The information I wanted to get is this: Have

Dr. Juvet. you ever had, Dr. Grieves, a case of a similar nature under observation, and have you had the opportunity of perceiving the effect of the removal of the pituitary body, and if so to what extent did you get a diminution of bone tissue beyond the normal from the removal of the pituitary body?

Dr. Grieves. That is just the reason for writing this paper. I do not know, and we must all make observations. The condition in your case was asymmetrical. Those I have seen have been symmetrical. I have seen but one case that has reduced. Operations on the pituitary body are comparatively rare. I

have seen one case that has been reduced somewhat, but I have not seen any returns such as described by the different authorities. In those I have seen the mandible was symmetrical. There was apparently growth of the alveolar bone with symmetrical growth of the malar region and mandible, not asymmetrical, as in your case.

Do I understand that we are to gather the idea

Dr. Ottolengui. from what you have said that this overgrowth, although symmetrical, will be confined to the mandible?

If there is overgrowth traceable to some influence of the pituitary body, is it always confined to the mandible or may it involve the maxillary bone?

Dr. Grieves. I mentioned the mandible and the malar region.

Dr. Ottolengui. Would it also involve the maxillary bones in some cases?

Dr. Grieves. It might involve one bone and not the other. It is not explainable.

Dr. Ottolengui. If it is not explainable, it is not much of an hypothesis. What I mean is this: I have been looking at this subject from a logical standpoint, and I find it difficult to understand why the influence of the pituitary body would cause overgrowth of the mandible and not affect the maxillary bones at the same time. In these acromegaly cases we see the influence extending elsewhere besides the mandible, as in the first picture thrown on the screen by Dr. Grieves, where there is undoubtedly an increase in growth in the forehead, and the hands also have increased in growth. It is hard to believe that this pituitary influence can be confined to such an isolated locality as the mandible alone.

**Dr. F. C. Remple,
New York City.** When Dr. Grieves writes a paper it is usually one of importance and interest to the profession, and the present essay is no exception in this respect. The subject of "Internal Secretions" is one of profound importance and interest to both the medical and dental professions, and in handling this subject the essayist is dealing with one which offers a broad and almost virgin field for research, the surface of which has not even been delicately scratched.

A short time ago a paper was read at Albany before the New York State Dental Society on the subject of internal secretions. One of the members of the Program Committee, in casting about to find some person who could intelligently discuss such a paper, called up on the telephone a prominent physician in New York City and asked him if he could suggest some one. The physician thought for a moment, and then, calling this member of the committee by name, said, "Well, Bill, none of

them really know a blank thing about this subject, so it doesn't make much difference who you get to discuss it." (Laughter.)

As I listened to the essayist it struck me that one of the chief thoughts running through his paper is that the internal secretions exercise a very important influence over the development, not only of the maxilla and mandible, but of all parts of the body, affecting particularly the osseous structures. Also the essayist has cautioned against accepting any positive statement concerning just how these secretions influence the process of growth, or just why they do it. About all that we know at the present time concerning them is, that they are not the useless, functionless organs that they were at one time supposed to be; that they play an important part in balancing the metabolism of the organism, and now it is up to the physiologist to find out how they play this part, and in what manner their action can be controlled.

This subject offers a valuable and fertile field for research, and I believe the essayist intends this paper to be more as an introduction to a study of the subject than an attempt to deal with it exhaustively.

Dr. Grieves.

A protocol only.

Dr. Kemple. Yes, a preliminary to the study of the possible relation that internal secretions may have to malocclusion. He is not making any positive statements;

he has simply collected and presented his data to this society as a contribution to the study of the subject, and to stimulate an interest and further study by members of this society. But it would be well to emphasize the caution which he has expressed, *i. e.*, not to accept these statements as either positive or final. It is all too soon for anyone to say that this condition or that condition is caused by pressure on the anterior left lobe of the pituitary body, or by a pathological state of the hypophysis, or of some other part of this poor little body. One may think it, but does he know it?

In regard to the Indian children: A few years ago, while up in Canada, I had an opportunity, through the courtesy of one of their Indian agents, to examine the mouths of a large number of Indian school children between the ages of six and fourteen years. It happened to be holiday time, but this gentleman called a meeting of these children at the school house and we had a regular examination. I spent several hours in studying their mouths, and in making the examination I measured the arches according to the Hawley charts. I found them all, without any exception, to be well developed arches, practically normal in width. Also, there was practically normal occlusion in all of them except where approximal contact had been destroyed by caries, or teeth had been prematurely lost and adjoining teeth had drifted into the space.

**Dr. Grieves
(Closing).** Our internal secretions are very much disturbed, no doubt, by the first point Dr. Kemple made, although I will say the quotation was taken from Dr.

Tandler. He made the remark that the effect on the jaw might be from syphilis in the mother affecting the child in utero; that is, the effect of the syphilitic mother on the bones of the child. He also mentioned rickets. Disagreeing with my friend, Dr. Kemple, I believe there are many assured facts in this work, and this work is going on rapidly. I think there are assured facts when Dr. Mayo will perform 1,500 thyroidectomies to relieve goiterous conditions. There are certain hypotheses which have been proven on which surgeons are working. There is no reason why we should not work on the same hypotheses as far as they have gone.

Dr. Kemple. My statement is that I do not believe there are any facts already obtained that have a direct bearing on malocclusion at the present time.

Dr. Grieves. My hope in bringing this paper before you was to assemble the facts known to-day in relation to the possibilities in orthodontia.

It would be nice if the members of this society could make such pilgrimages as are made by some societies in going from museum to museum and studying the conditions in these museums, such as the Society of Americanists, for instance. It would pay us to make a pilgrimage to these points and see the large numbers of specimens, just as it would pay us to visit the National Museum to look over the eleven thousand skulls there. I came here for information and to present data for your benefit in regard to orthodontia. We are going to try to do a little more, and I hope that you will take it seriously enough to go home and associate yourselves with pediatricians and internists and get them interested, and the best way to get them interested I have found is to be very conservative. I have a few children on lactate of calcium, barring the use of thyroids, since the first of the year, and have had interesting results. I am not thinking of the old scheme of feeding lime, but of the lactate of calcium as a possible activator of the glands with internal secretions. I wish you would notice children who have enamel hyperplasias, who lose their temporary teeth very early and then are slow in erupting the permanent teeth. I would suggest the use of lactate of calcium in such cases, and it can be given quite freely in these conditions.

I thank you very much for your attention.



Society Papers

Mouth Infections; their Cause, Treatment and Systemic Effect.

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Infection may be defined as "the succession of changes induced in the organism generally by the growth within it of microbes." (1) All infecting organisms are living proteins capable of growth and multiplication. (3) Though simple morphologically, they are chemically quite as complex as are many of the cells of the higher plants and animals. Like all living things, they must feed, assimilate and excrete. This they do through the activity of their ferments, which are of two kinds—extra-cellular and intra-cellular. These ferments are specific in two senses: first, each cell elaborates its own ferment; secondly, this ferment is able to split up only certain proteins. They are further influenced by the relation between ferment and substrate, and by the accumulation of fermentative products. The pathogenicity of an organism depends upon its ability to grow and multiply within the animal body. (3) Its inability to do this may be due to the fact that it cannot appropriate to its own use the proteins of its host, or it may be destroyed by the ferments which it provokes within the body. Infection depends largely upon the number and virulence of the organisms involved, and to the resistance which the body cells offer to their growth and development. The effectiveness of these defensive ferments are influenced by age, heredity, environment, health, etc. Infections may be acute or chronic, systemic or local. When the infecting organisms multiply rapidly, leading to a general sensitization of the body cells, the disease is acute. When, on the contrary, conditions are less favorable to their growth, and sensitization is not general,

the disease assumes a chronic form. When widely distributed throughout the body with general sensitization, the disease is systemic, while on the other hand, with restriction of organisms and sensitization, the disease may be regarded as local. (8) In one sense, there is no such thing as local infection. An infective process cannot be segregated or its boundaries defined. Even Nature cannot do this, though the attempt is made, and under favorable conditions a measure of success is achieved. An infection so slight as to pass unnoticed may be the exciting cause of an arthritis deformans which will cripple for life, or it may produce an irreparable heart lesion. Again, such conditions may exist for years and leave no effect which we, in our clumsy way, can appraise. They must, however, register themselves somewhere in the body; their effect may or may not be permanent, but it is probable that in every instance a tax is imposed.

Infections which take place in the oral cavity are no exception to these laws. Their effects cannot be limited to the mouth, nor can their influence upon the general health be measured. It is impossible, with our present knowledge, to estimate the possible consequences of any infection, no matter how insignificant it may appear. There is only one safe rule to follow in every case and that is wherever possible to eliminate them altogether, and this whether there is or is not evidence of systemic poisoning. To do less than this is reprehensible.

**Importance
of Mouth
Cleanliness.**

Because of the intimate relation which the mouth sustains to the organs of digestion, its hygiene is of prime importance. Infections causing the greatest number of diseases find their way into the system, via the alimentary and respiratory tracts. (2)

An unclean mouth, in which there are no lesions of the soft tissues and no localized infection, must be regarded as potentially if not actually dangerous, since it is undoubtedly the root of most dental diseases and their sequelæ. Less than 20 per cent. of the people have healthy mouths. The infected mouth shows a tendency to the acid reaction, and it is through this acid change that we have an additional danger in cell degeneration, of malignant type, from chronic irritation. (2) How common such conditions are, only the dentist knows. Very few people keep their mouths as clean as they should do, or as clean as they think they do. The result is that it harbors vast numbers of germs which may find their way into the crypts of the tonsils, the gastro-intestinal tract, the accessory sinuses, finally breaking down the soft tissues of the mouth, and establishing there chronic foci of infection.

The danger lies in the constancy of the bacterial supply and the



strain which it imposes upon the defensive forces of the body. A clean and healthy mouth should be the end of every dental operation. No patient should ever be dismissed until his mouth is clean and he has been most carefully instructed in how to care for it himself. This is said realizing that it is not always possible to do this, through inability to control all patients, and realizing also that it is the most neglected feature of general dental practice.

**Dental
Hygienist.**

The "dental hygienist" who thoroughly cleanses the mouths of her patrons is rendering a far more valuable service than is the dentist who, neglecting this, makes the most perfect restorations of gold and porcelain. This is the first lesson in the dentistry of the twentieth century. In an address before the National Dental Association last year, J. C. Bloodgood, M.D., said (16): "The great majority of dentists prefer to do the most expert mechanical work—bridgework and other things that require great skill. They do not like to clean teeth. The day is coming when more lives will be saved by keeping the people's mouths clean than by doing bridgework. The preventive measures of dentistry are tremendous. None of us realize what they are. We do not know whether leukæmia, pernicious anaemia, Banti's disease, Hodgkin's disease, and many others (all incurable), do not get in through the teeth. Perhaps many abdominal lesions, such as gastric ulcer and appendicitis, are traceable to infections which get in through the teeth as well as through the tonsil. So this thing you like not to do, cleansing the teeth, may be the most important and expert thing you can do. I believe it is an expert thing."

**Partially Erupted
Third Molars.**

A not uncommon chronic infection to be found in the mouth is that caused by partially erupted third molars, especially those of the lower jaw. It is surprising how often these are overlooked, and how often they may be the obscure cause of grave systemic symptoms. The crowns of these teeth are often malposed with only one or two cusps visible above the gum line, inviting infection which at times may be acute, but more often is chronic and wholly unsuspected. Pressure of the finger along the buccal and lingual surface of these teeth not infrequently reveals an astonishing amount of pus, which drains into the mouth and nasopharynx, with probably more or less direct absorption. No examination of the mouth is complete which does not include a careful scrutiny of all such teeth. When malposed, or when insufficient room makes improbable their taking their proper place in the arch, they should be promptly extracted.

**Crown and
Bridgework.**

Another prolific source of mouth infection, and one for which the dental profession must be held responsible, is the vast amount of ill-fitting and unsanitary crown and bridgework (usually non-removable) that is being made use of, complicating and often making impossible the proper cleansing of the mouth. Most of this class of dental operations is wholly unnecessary, since there is usually a solution of the problem in some other way. They have their origin in a desire on the part of the patient to fill in the space made by the loss of teeth with an appliance that is stationary, and with no appreciation of its possible danger. Every crown that causes a chronic inflammation of the gum margins, every mechanical restoration that cannot be kept clean, is just as surely a source of infection as is the chronic abscess or pyorrhea. The time has forever gone by, in fact, there never was a time when mechanics as applied to dentistry had any right to the center of the stage, had any right to be considered as it has been, the alpha and omega of dental practice.

Dento-Alveolar Abscesses.

One of the most common infections occurring in the mouth, because found at all ages, is the chronic alveolar-dental abscess. These abscesses are caused primarily by non-vital teeth, and may be divided into two classes—the fistulous and the blind abscess. They may also be divided according to the source of their infection—whether it be via the mouth or blood stream. The complete bacteriology of these infections is still uncertain. (5)

The prevailing organism appears to belong to the streptococcus group. (15) It is important that more study be given to these infections, especially with a view of ascertaining the relationship which they may sustain as causative factors in hematogenous infections. In those cases which present without previous treatment the removal of the gangrenous tooth pulp, disinfection of the pulp canals and proper filling of same will usually effect a cure. In those which do not yield, and in that large class of cases resulting from faulty root treatment, radiographs are essential to correct diagnosis and treatment. When there is an appreciable area of necrosis, involving the body of the bone and root end, a root resection is in most instances necessary. This is especially true of blind abscesses, since it is the most prompt and effective way of eliminating them altogether. Where the radiograph shows only slight decalcification, and the root can be filled to the end, nature will usually effect a cure. But in all cases where a root cannot be filled to the end, and where infection has already taken place in the peri-apical tissues, however slight it may be, the unfilled portion of the root should be amputated. This is a simple operation, and yet one in which a careful technique should be observed.

Apicoectomy. The first requisite is a good local anesthetic, novocain being most satisfactory. Since it is important to have a bloodless field in which to operate, adrenelin ch'oride, or some of its synthetic substitutes, is desirable. Having the field of operation thoroughly anesthetized, a V-shaped cut is made in the gum with the apex toward the tooth. This should be dissected back, exposing that portion of the bone directly over the necrotic area. If the abscess has a sinus, this will be visible. With a small round bur this should be enlarged, or if there be bone, as in blind abscess, a hole should be drilled through into the cavity within the bone. This cavity will usually be found filled with a fibrous granulation tissue, all of which should be removed, and the cavity extended until healthy bone is reached. The root, which should be previously filled when possible, should then be amputated flush with the floor of the cavity. When the root does not extend far into the cavity, the most satisfactory way of doing this is with round bone burs of various sizes. With the use of a proper amount of adrenelin, the operation will be practically bloodless, permitting a clear vision of each step taken. When all is done, the cavity in the bone should be irrigated and packed with sterile gauze, after which the gum flap should be brought back into place. There is no need of suturing this, as the parts will be kept in apposition by the lips and cheek. Since it is necessary to change these dressings every two or three days, until the cavity has filled in, a small opening at the apex of the flap must not be allowed to heal. This will close promptly with the removal of the last dressing.

When properly done there is practically no after-pain, though there is apt to be some swelling of the face for a few days.

The tooth so treated becomes as firm in its socket and as useful as before treatment. Clinically, the results are all that could be desired. In many of these cases, especially those in the upper jaw, radiographs show that these cavities ultimately fill in with an osseous deposit which, radio-graphically, is not unlike normal bone. In some cases it is probable that this does not occur, the cavity filling in with granulation like tissue. Clinically, it seems to make little difference. There are, of course, certain cases which are inoperable, where the root has been so far involved in the necrosis as to be permanently weakened. Such teeth should be extracted.

Pyorrhea Alveolaris.

Pyorrhea alveolaris has long been a subject of inconclusive debate. Even at present the most speculative and unsubstantiated views are entertained. There is no agreement as to its etiology, pathology or treatment. It is a disease which assumes a multiplicity of types, with an

endless variety of gradations, and no generally accepted classification. So chronic is it that it may exist in the mouth throughout the whole of adult life. As a potential trouble maker, it is the king of mouth infections. The best authorities on the subject are of the opinion that while it may be, and doubtless is in certain cases, a purely local disease in its inception, it may, and not infrequently does, have a systemic predisposition which may be inherited or acquired. What this predisposition is, is uncertain, but there can be little doubt of its existence. In many instances it is doubtless of metabolic origin. (22) Whether this predisposition is sufficiently potent to cause the disease, if careful attention is given to local preventive measures, is uncertain. The disease begins at the gingival margin of the gums, the exciting cause being some irritation, which causes a solution of continuity, followed by infection and inflammation of the gums, necrosis of the alveolar bone and pericemental membrane, which, if not arrested, continues until the supporting tissues of the teeth are destroyed. With their loss the disease heals spontaneously.* If the irritation which produced the initial inflammation and subsequent infection were prevented, would the disease develop and run its chronic course? In a word, if the mouth were kept clean and the gum margins free from irritants, how many cases of pyorrhea would there be, even in those cases in which there may exist a predisposition? It is probable that there would be very few, though the care necessary to achieve this result would naturally be greater in some cases than in others.

In view of the widespread interest aroused by the announcement that the endamoeba buccalis is the direct cause of pyorrhea (18) (19), and that as a result of its destruction by emetin there is marked improvement in the disease (in not a few instances practically curing it), it is necessary to inquire into the claims made by the advocates of this treatment. In the *Proceedings of the New York Pathological Society*, 1907, Dr. L. T. LeWald presented a preliminary report of investigations which he had been carrying on as to the occurrence of amoeba in the mouth of healthy individuals. In this report he says he was able to convince himself that these amoebae would be demonstrated in the mouth almost constantly, no matter how much care was taken of the teeth. In the first examination of one hundred cases he obtained positive results in seventy-one. In going over some of the negative cases he found amoeba in four more, and he felt that with repeated examinations they could be demonstrated in most if not all the others, and concludes his report with these words: "There was left in his mind no doubt as to their presence

*The author is not unaware that this is denied by Goodby.

in the human mouth in health, equalling in this respect the presence, for instance, of the bacillus coli communis in the intestines."

In a paper entitled "*Amœba in the Mouths of School Children*," read before the New York Pathological Society in March, 1915, Dr. Williams, Assistant Director of the Research Laboratories of the New York Health Department, reported the result of an examination made by that laboratory. A preliminary examination was made of 475 school children, between the ages of 9 and 16. One hundred and fifty were chosen as representative cases, and subdivided as follows:

1st—Healthy gums, no caries.....	20
2nd—Healthy gums, carious teeth.....	22
3rd—Tartar and receding gums.....	47
4th—Spongy and bleeding gums.....	65

From most cases, two smears were made, the teeth and gums having been previously cleansed with a cotton swab dipped in 5% alcohol. These smears were then examined for amœba, with the following results:

Class 1—Healthy gums, no caries—positive.....	30%
Class 2—Healthy gums, carious teeth—positive..	50%
Class 3—Tartar and receding gums—positive...	84%
Class 4—Spongy and bleeding gums—positive..	94%

It will be observed that amœbæ were found in every class, and that in inverse ratio to the health and cleanliness of the mouth.

Commenting on this, the author says: "We can say nothing definite yet as to the significance of the amœbæ in these mouths. Finding them so often in apparently healthy mouths, and in such young children, does not agree with the statement of Bass and Johns and Barrett, that they are not found in healthy mouths."

From among my own patients I have to date (March 27th) selected 57 cases for examination as follows:

Pyorrhea (representing many types and all stages, from the earliest manifestations to hopeless cases).....	47
Unclean mouths, but free from pyorrhea.....	4
From around ill-fitting crowns.....	4
Clean mouths (meaning those of which one sees on a few in a year in perfect health).....	2

From one to five smears were taken in each case. These were fixed with methyl alcohol, and sent to the Research Laboratory for examination, with the following results:

- Pyorrhea, 47 cases. Positive, 46. Negative, 1.*
- Unclean mouths, 4 cases. Positive, 3. Negative, 1.
- Clean mouths, 2 cases, both positive.
- From around crowns. 4 cases, all positive.

*A re-examination showed this to be positive.

From among the pyorrhea cases there were selected only five for emetin treatment. These showed an abundant discharge of pus, representing different types of the disease. In one case, 28 teeth were involved; in another only four, but all were cases in which the prognosis was favorable. In a word, there were no hopeless cases among them. None had less than six half-grain doses of emetin, subcutaneously injected (one-half grain daily), and two had more. At the conclusion of these injections, smears were again taken, never less than three, and from all parts of the mouth. Numbers 1-19 and 46 were still positive, numbers 5 and 60 were negative. Case No. 1, 28 teeth involved, was then treated with a one-half per cent. solution of emetin flowed into the pockets daily for seven days, one Sunday intervening. Several smears were then taken; all were positive. In none was there any improvement which could be observed after the most painstaking examination, except that in Case 19 there was less inflammation of the gum around one especially bad tooth, possibly due to the hemostatic action of the drug. This case had had six half-grain doses of emetin, and several times the pockets were flooded as directed, yet two of the three smears were still positive. In none of them had the pus decreased. Four of the patients reported that their gums felt better, and No. 1 complained of an unpleasant feeling, "as though the gums were rubbed with alum," as she expressed it. How much of this was psychological I do not know. One patient was nauseated and vomited after the first injection of one-half grain. It is realized that these cases are too few to have of themselves any evidential value. They form a part of an investigation begun long before the invitation to prepare this paper was received, and are reported here merely as corroborative of the findings of LeWald and Williams.

It is too early to form any final conclusions regarding the rôle the endamoeba may play in the etiology of pyorrhea, or of the therapeutic value of emetin in its treatment. However, in view of the evidence already at hand, it may not be out of place to inquire into the present status of this so-called "wonderful discovery."

In the light of this evidence there can be little doubt that the endamoeba is present in practically all mouths, contradicting the statement that they are found only in mouths in which there is pyorrhea. (19) It is also probable that emetin is an amoebicide, but an uncertain one at the dosage advocated. Another characteristic of emetin, and one of which no mention is made by those advocating its use in pyorrhea, is its hemostatic action. (21) An interesting question which naturally suggests itself in this connection is whether the improvement in the gums ascribed to its amoebicidal quality may not be due to the fact that it is a hemostatic. The fact that cases with inflamed gums show improvement

in this respect, and the statement of patients that their gums feel better, points to this as the explanation, as does the fact that those who were conscious of this improvement while under treatment, after it was discontinued, state that the feeling of improvement gradually disappeared, and that they lapsed back to the condition which prevailed prior to treatment. If this be true (and there is at present no proof that it is not), its effect can only be transitory. On the other hand, if this improvement be due to the amoebacidal action of the drug, it must also be more or less evanescent, since it is practically impossible to permanently eliminate the ameba from the mouth. Whatever its action may be, there as at present no trustworthy evidence that it will cure pyorrhea. Until this can be done in a sufficient number of cases, and by a number of investigators working independently, there can be no justification whatever for the claim that the endameba is the specific cause of pyorrhea. (18)

The Bacteriology of Pyorrhea.

The most striking thing in connection with a study of the bacteriology of pyorrhea is its complexity. Not less impressive is the lack of agreement in the findings in different cases. That this may be the more clearly understood, I have selected from among others three cases of pyorrhea of which a bacteriological study was made by the Research Laboratories of the New York Health Department, and tabulated the results; also for comparative purpose, those obtained from study of the tonsillar flora in one case and of the salivary and tonsillar flora of a healthy mouth. All are based on reactions determined under identical conditions. Only cocci or coccus-like organisms, which represent a minor fraction only of the total bacteria present are included. An analysis of these cases show that all were represented in the four main groups—cocci (cocci-bacilli), cocci (lanceolate chains), diplococci (chains), cocci (not classified)—that they sub-divided into forty-two subgroups, in which they were in agreement in only eight instances, and disagreed in thirty-four, and that they were represented in these sub-groups by seventy-eight different cultures. In the case of the tonsillar flora taken from one of the pyorrhea mouths, it was represented in three of the main groups, and in eleven of the sub-groups by twenty-one different cultures. In only one sub-group did it agree with the pyorrheal flora.

The flora of the healthy mouth fell into two of the main groups only, and into six sub-groups, showing twenty different cultures. In no instance did it agree in the sub-groups with the flora in the pyorrheal cases, but did so in three of the six sub-groups with the tonsillar flora of the pyorrheal case. Despite this disagreement, however, it is probable that the organisms present in pyorrheal pockets are also found in healthy mouths, but in such relatively small numbers that a single examination

does not reveal them all. Finding a more favorable focus in the pyorrhreal pocket, they multiply more rapidly, thereby assuming a preponderance. The difference, therefore, is a quantitative rather than a qualitative one. Such quantitative variations are observed in the number of spirochætes and fusiform bacilli in normal and abnormal mouths, the latter not necessarily pyorrhreal.

While these results cannot be taken as absolute, they afford some idea of the complexity of the mouth flora, rendered more complex by the presence of pyorrhœa. This is the more impressive when it is realized that the coccidi groups represent only a small fraction of the organisms present, and that a careful study of the various other aerobic types and their differentiation, together with that of the anaerobic flora, would probably result in similar varied and complex findings.*

Vaccines in Pyorrhœa.

The first requisite to success in the vaccine treatment of any disease is to establish the causal relationship of the organism to the disease under consideration. Since each organism provokes in the body its own specific ferment which has no influence whatever upon organisms of unlike nature, the importance of clearly establishing this relationship will be obvious. So sensitive is this balance between organism and ferment that the slightest variation of type may render the vaccine worthless. In nothing is absolute accuracy of more importance than in vaccine therapy. When it is realized that at present there is not the slightest proof that any of the organisms associated with pyorrhœa sustain any causal relationship to it, the irrationality of selecting one or two types out of the vast host of organisms present, and making these the basis of vaccine treatment, must be self evident. In the light of our present knowledge, vaccines of this character have no place whatever in the treatment of this disease.

Treatment of Pyorrhœa. Pyorrhœa is a preventable disease, probably the most easily preventable of all those occurring in the mouth. It is also a curable disease, though every case will, if long enough neglected, reach an incurable stage. The prognosis, therefore, depends largely upon the stage to which the disease has progressed. Treatment consists in a careful curettement of each pyorrhreal pocket, the removal of calcarious deposits and necrotic tissue, the correction of occlusion on weakened teeth, the stimu-

*Grateful acknowledgment for assistance in the preparation of this portion of the paper is made to Dr. Wm. H. Park, Director of the Research Laboratories, N. Y. Health Department. Dr. Anna W. Williams, Asst. Director. Dr. Chas. Krumviede, Jr., Chief Bacteriologist, and to Dr. Wm. R. Williams, Visiting Physician to the N. Y. Hospital.

lation and massage of the gums, and the maintenance of a high standard of mouth hygiene.

Inquiry should always be made regarding the patient's general health and habits of life. In all cases where a constitutional relationship is suspected, a careful physical examination should be made and the co-operation of the family physician sought. With our present limited knowledge of these relationships, dependence, however, must be placed upon local treatment. When this is skillfully done the results are most gratifying. The discharge of pus ceases, the gums resume their normal color, the teeth tighten in their sockets, and the patient is able to use them more or less freely? When not too far advanced, the disease can be permanently cured by such treatment.

There are, of course, incurable cases, and what is more frequent, teeth that are incurable in mouths where many of the teeth are only slightly involved. It is not always easy to determine when a given tooth is incurable, and the attempt is often made to save such teeth with discouraging results to both dentist and patient. When in doubt, the tooth should be radiographed.

When the dental profession realizes that pyorrhea is a preventable disease, that in its early stages it is easily and permanently cured; that only those cases are hopeless that are long neglected; that no drug or vaccine ever will of itself cure the disease, and that dependence must be placed upon local treatment, they will have taken the first step toward the elimination from the mouth of their patients of the chief of mouth infection.

Possible Systemic Effects of Mouth Infections.

That infections located in the mouth may be the cause of systemic disturbances more or less grave there can be little doubt. What per cent of these have been definitely shown to be the direct cause of such disturbances, what is their relative potentiality for evil, and just how they are brought about, are details about which we know little, and which must be studied before we can hope intelligently to co-operate with the physician in the care of these cases. With our present limited knowledge concerning these secondary infections, a word of caution against the hysteria which ascribes to oral diseases the cause of unnumbered ills may not be out of place. There can be no doubt that there is, in not a few instances, a disposition on the part of both dental and medical men to overestimate the rôle which these infections play as causative factors in more serious diseases, and in certain cases to ascribe to them etiological relationships, the correctness of which it would be difficult, if not impossible to establish. For example, the physician consults the dentist in a case of chronic arthritis of several years' standing. A dental exam-

ination reveals the presence of several non-vital teeth. These are radiographed and give evidence of disturbance, ranging all the way from a slight rarefaction to clearly defined blind abscesses. These teeth have been filled for years, and there is no history of trouble since. Knowing as we do that the infection which takes place in the joints is always hematogenous—that is, takes place via the blood stream—and that a certain per cent. of periapical infections are also hematogenous (what per cent. no one knows), how is anyone to know whether or not both of these infections may not have resulted from a general bacteræmia of mild type, and that they both have developed coincidentally with the same cause? Also, if the joint infection antedated that in the jaws (as it may have done), may it not have actually caused the latter? This is only one of several questions regarding the etiological relationship of these infections which cannot at present be answered. Until more light is thrown on these interesting problems no one can afford to be dogmatic.

As a result of this over-enthusiasm, teeth are extracted which are innocent in offense, and patients otherwise subjected to treatment wholly unnecessary. Calling attention to the wholesale removal of the tonsils following the discovery of the relationship of tonsillar infections to those occurring in other parts of the body, Gilman says (15): "A similar fad is growing relative to the removal of teeth since the discovery that jaw abscesses and pyorrhea alveolaris are equally potent as foci for secondary infection as are the tonsils. Some physicians are rather indiscriminately sending their patients to the extracting specialist, requiring removal of several or all of the teeth, supposing them to be a factor in some lesion, when their removal is not always justified."

Let us be sane in the matter, not forgetting that other infections are quite as likely to be responsible for the systemic disturbances as are those resident in the mouth. When consulted by the patient or his medical adviser, one should therefore be cautious about overconfidence in prognosis as regards secondary infections. They by no means always clear up after the infection in the mouth has been removed. Apropos of this, Billings says (9): "I think we should not use the word 'cause' too much in relation to the focus of infection of a systemic disease. We should not, even with the focus before us, say that that focus is the absolute cause." There can be only one safe and dignified course for the dentist to follow in these cases, and that is to advise the conservative eradication of all such foci from the mouth.

In the treatment of these cases there must be closer co-operation between dentist and physician. The latter, suspecting a dental complication, can no longer dismiss his patient with "Go and see your dentist." That the more progressive physicians are realizing this is evident from

the following quotation by Camac (12) : "In using the term co-operation, I do not mean to infer that the patients were told to consult the dentist merely, but I accompanied them to the dentist's office, and studied with him the radiographs and local conditions. I believe such consultations to be as necessary as those common between surgeon and internist. When a pyogenic dental infection requiring liberation of pus existed, arrangements were made for bacteriological specimens to be procured at the dentist's office, and later, if conditions indicated, a specimen of blood for culture and complement fixation tests was taken. A certain number of dentists are in accord with this practice; indeed, a small number have gone beyond the medical practitioner, and without his co-operation are studying cases with just such thoroughness as outlined above."

It is equally important that the dentist seek the co-operation of the physician in the treatment of these cases, since he may, with no knowledge of the secondary infections which may exist, eradicate a focus of infection, thereby making it impossible to obtain a culture of the very organisms responsible for the lesion and from which an autogenous vaccine could have been made.

Since the physician's responsibility is greater than is that of the dentist, it is his privilege, with the patient's consent, to call in consultation whomsoever he feels can best co-operate with him in the treatment of these cases. If this happens not to be the family dentist, the family dentist can have no cause for complaint. As Dr. Camac has said, there are a certain number of dentists who by their study of these cases have fitted themselves for such co-operation. He also says: "There is, however, among the dentists a large class of dental tinkerers who practice upon the easy persuasibility of the public."

This, unfortunately, is also true, and places upon the physician no little responsibility in the selection of a dental consultant.

Micro-organisms from mouth infections find their way into the circulatory system via the gastro-intestinal tract and by direct absorption. Pus that is discharged into the mouth and swallowed is less likely to cause trouble than is that which finds its way into the blood stream direct, which explains in part why it is that fistulous abscesses and pyorrhea alveolaris with free drainage are often less pernicious in their influence than are those infections in which the organisms are confined.

Under normal conditions, bacterial proteins are broken up by the digestive ferments of the gastro-intestinal tract into non-protein split products, mostly amino-acids. As a result, the poisonous group, not readily diffusible, is rendered inert. (3) Adami says (1): "When, however, there is gastritis with arrest of secretion or diminution of the H. cl., the same is no longer true. Then not only are the bacteria not

destroyed, but escaping into the small intestines they find the alkaline contents of the same a favorable medium of growth, and proliferating, may by their products induce extensive irritation." This further explains why pyorrhea in one case compromises the health of the patient while in another there is no such evidence. Regarding the bactericidal action of the gastric secretions, Mayo says (2): "We have long looked on the acids of the stomach as destructive to mouth bacteria, but Smithes, in a microscopical examination of gastric extracts from 2,406 different individuals with stomach complain (dyspepsia, indigestion, and the like), showed that irrespective of the degree of the acidity, bacteria were present in 87 per cent."

When such impairment exists, the bacteria are not destroyed by the gastric ferments, but find their way into the blood and tissues as unbroken proteins, where they must be digested by the body cells. This is done by the elaboration of a specific proteolytic ferment, the cleavage action of which liberates within the tissues themselves, the poisonous atomic group common to all proteins and giving rise to those phenomena which with certain modifications characterize all infectious diseases. (3).

The bacteriology of mouth infections is not unlike that of the normal mouth flora. These organisms, especially the coccis group, when grown under changed cultural conditions, such as prevail in alveolar abscesses, deep pyorrheal pockets, tonsillar crypts and the like, undergo transmutation (20), as a result of which their virulence may be greatly increased. The principal factors in this change seems to be animal passage and lowered oxygen tension. (17) As a rule, bacteria grow best in free oxygen. They may, however, exist in the complete absence of free oxygen, and a small number can only grow when free oxygen is altogether absent. (1). As a result of these changed cultural conditions, bacteria also acquires a selective affinity for other tissues, such as the gastric mucosa, the endocardium, cartilages, etc. Some subtle change takes place which may best be explained in Rosenow's own words (4): "One striking thing in connection with some of the more chronic infections is that the character of the micro-organisms found in the lesion may be quite different from the character of the micro-organism found in the focus of infection at the same time. My study on the effect of varying degrees of oxygen tension on the members of the streptococcus group, together with other facts, makes it likely that it is in the focus of infection that changes in virulence occur, and the different affinities for various structures are acquired. In other words, the focus of infection is to be looked on not only as the place of entrance of the bacteria, but also the place where the organism acquires the peculiar property necessary to infect. In the light of our present knowledge, the argument that

infections in the mouth are so common in individuals in apparent health does not minimize their importance. These or other foci are so common in patients suffering from arthritis, neuritis, appendicitis, ulcer of the stomach, cholecystitis, goitre, etc., and so rare in individuals who have had superb health for years, that their direct etiologic rôle can scarcely be questioned."

Among the more common diseases which may result from mouth infections are digestive disorders, including gastric ulcer, arthritis, anæmia, endocarditis, functional disturbances of the kidneys and malaise. This last can hardly be called a disease, but a symptom of disease. It is surprisingly common in all classes of mouth infection. In view of the interest which all must feel in the etiological relationship of mouth infections to systemic diseases, a brief consideration of a few of the more common may be helpful.

Arthritis is one of the most common of these.

Arthritis. It is essentially an inflammatory process caused by infection, the effect of which depends upon the virulence of the infecting organisms, the constancy of their supply, and the defensive forces of the body cells. It frequently occurs as a result of general infections. In thirty-eight cases of arthritis deformans, Rosenow (13) excised the lymph nodes, draining the involved joints, making cultures from them, reserving portions for microscopic study. Organisms were found in all but three cases where the disease had existed from two to seventeen years. Streptococci were found in fourteen cases, and a streptococcus like organism, completely or partially anaerobic, in nine cases. A significant feature was that microscopic sections of the adjacent muscle tendon and articular capsule in several of these cases showed a complete plugging of the blood vessels as a result of endothelial proliferation. It was in these areas that bacteria were found. He concludes: "For these reasons the changes observed in the blood vessels about the infected joints may be regarded as primary rather than secondary, and it would seem as though in arthritis deformans, the micro-organisms are taken up from the circulation by the endothelial cells which proliferate freely so that eventually the blood supply is reduced or cut off, in consequence of which there results areas of lowered oxygen tension, diminished nutrition and atrophy. Such conditions would favor the growth of organisms which on isolation are sensitive to oxygen."

Here we see the possible relationship which chronic mouth infections may sustain to arthritic conditions. The organisms associated with mouth infections belong to the cocci group; they are constantly finding their way into the circulation; they undergo certain changes by which

they may become partial or complete anaerobic, and they exercise an irritant effect upon the endothelial lining of the blood vessels, causing a proliferation of these cells, and a more or less complete plugging of the capillaries of the joints with consequent impairment of nutrition. Experiments have shown that diminished blood supply will of itself cause the changes peculiar to arthritis deformans in the joints of animals. (9) (13).

Among the chronic infections which may be responsible for these conditions are pharyngitis, tonsilitis, pyorrhea alveolaris, cholecystitis, gonorrhea, endometritis, sinusitis, alveolar abscess, and phthisis. It should not be forgotten that arthritis is a secondary infection, and that intelligent treatment consists in the localization and removal of the primary focus. This should be done early, for after the joints become deformed, the patient may become a hopeless cripple in whose case treatment may avail little. Milne says (11): "Some inflammatory focus may be found which may be the etiologic factor, and by the cure of this condition the joint disease may become limited or cured. One must not, of course, because some infective focus, such as pyorrhea, for example, exists, immediately conclude that it is the cause of the arthritis. All possible sources of infection must be searched for and treated accordingly. It is remarkable, however, how many cases of progressive arthritis, which may for long be only a recurrent synovitis, but which tends eventually to develop into profound arthritis deformans, are due to pyorrhea. In this case certain streptococci of comparatively low grade pathogenicity are the usual cause of the joint changes."

Digestive Disturbances. Disturbances of digestion as a result of mouth infections are not uncommon. Unfortunately, there is little knowledge of an exact nature to indicate what this relation is, or how it operates.

In most instances the disturbance is functional, which may for long be little more than a chronic dyspepsia. If neglected, it is impossible to anticipate the possible consequences. We have seen that organisms which are swallowed are less liable to give trouble than are those which find direct entrance into the blood stream. We have seen also that when the gastric secretions are subnormal, the organisms are not destroyed, and that the bacterial poison may find its way into the circulation. Since in many cases it is probably only a question of time when the gastric secretions are broken down under the constancy of the bacterial supply, it is of the utmost importance that the mouth be kept clean and healthy. It is not improbable that many abdominal lesions are directly or indirectly traceable to infection located in the mouth. (16). It is also true that mouth organisms may cause gastric ulcer via the circulation. Rose-

now says (10) : "The supposed relation between infected tonsils or gums and gastric ulcer may be due not to the swallowing of the bacteria, as usually supposed, but to the entrance into the blood of streptococci of the proper kind of virulence to produce a local infection in the walls of the stomach," due to their selective affinity for this tissue.

Anæmia is not infrequently associated with

Anæmia. mouth infections due to the hemolyzing action of the organisms which find their way into the blood from

these foci, where they act upon the red blood cells, leading to their dissolution with liberation of the contained hemoglobin. Certain of these cases are associated with depression which may develop into chronic melancholia. Craig says (7) : "The continued swallowing and absorption of pus is undoubtedly the cause of disorders of digestion, headache, and finally an anæmic condition almost cachectic. This depleted, exhaustive state may often be associated with a melancholic state. It seems a far cry from mouth infection to mental disease, but when one witnesses profound depression clear up following the drainage of several alveolar pus pockets, one is persuaded that the chronic intoxication, the result of absorption from the pent-up infectious process, was an etiologic factor."

Malignant endocarditis (9) caused by the streptococcus viridans, headaches of a rheumatic type (6), pachymenigitis (7), myositis (9), are all examples of diseases in which mouth infections may play an etiological rôle.

No one with any appreciation of the meaning of all this can fail to be impressed with the responsibility which rests upon the dentist in the prevention and treatment of oral infections. Nowhere in the body is the opportunity for prevention so great as in the mouth. With proper care (which would involve a co-operation on the part of the patient at present unattainable), alveolar abscesses could be prevented with the possible exception of that small per cent. which might result from trauma. If tooth extraction were as limited as it might be, bridgework would be eliminated, as would the filth so often associated with it. Pyorrhea alveolaris always begins in an insignificant irritation at the gum margins, the removal of which would prevent its development with all its disastrous consequences in 90 to 100 per cent. of cases. It is true that it is not possible at present to obtain the co-operation of even those who patronize the dentist with more or less regularity to achieve all these results. The public must therefore share with the dental profession the responsibility for these conditions. But (and I say this in no spirit of criticism) a tremendous responsibility rests upon the dental profession, a responsibility far greater than that which rests upon their patients, and one which they have not met. It is a fact that in many instances the mouths of their patients are

not kept clean, that they are not instructing them in the proper care of their own mouths; that they are introducing into the mouth crowns and bridges which cannot be kept clean; that they are more or less indifferent to chronic alveolar abscesses, and are still telling their patients that pyorrhea is an incurable disease.

Right here lies the foundation for the charge that the dentist is only a mercenary tinkerer, who in looking into the mouth sees only the holes in the teeth, with no thought of the service he may render. The dental profession should be the guardians of the health of the mouth, and indirectly minister to the health and well-being of every patient whom they serve. No dentist worthy of his high calling can be indifferent to the hygiene of the mouth, can neglect those preventive measures, the observation of which would probably do more to elevate the standard of health than any single thing that could be done.

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The Panama Pacific Dental Congress.

It may be said that the Panama Pacific Dental Congress was a success. Indeed, considering the fact that the total membership was quite up to expectation; that the attendance at sections where papers were read was very materially greater than at any other congress held in this country, and better than at the London Congress, where, as in this case, the great war interfered with the international character of the gathering; remembering, too, the exceptional quality of many of the papers presented and the number and nature of the clinics, it is not too much to say that this congress will always be counted as one of the most successful within the history of dentistry.

No building, perhaps, exists in the entire world better adapted to the needs and purposes of such a congress than the Civic Centre Auditorium. The new Civic Centre, in San Francisco, occupies a large plot immediately west of the old brown stone pile which served as the City Hall until burned during the great conflagration. Perhaps no greater proof of the indomitable will of this stricken people to rise above misfortune can be found in any other spot. Standing *vis-à-vis*, we see the ruin of the old, and the majestic and imposing new white marble Municipal Building. To the south of this Civic Centre, and therefore facing the north, is the beautiful marble building, the Auditorium, which, with its many and spacious halls, assembly and lecture rooms, easily accommodated under a

single roof all the general and section meetings, exhibits and clinics, as well as affording rooms for fraternities, committees, local societies, etc.

Too much praise cannot be bestowed upon the various committees in immediate charge of the management of the congress. Full and satisfactory plans had been prepared in advance against every contingency, and where these prearranged plans were carried out, all went with attractive smoothness. Exceptions to the general rule occurred only when committees yielded, perhaps unwise'y, to selfish demands of essayists and clinicians.

Men who attend dental congresses, having promised to read papers or give clinics, should present themse'ves ready and willing to co-operate with the prearranged program. Those that besiege the members of the committees, urging that a different day or hour would better suit their individual conveniences, place their own selfish desires above the rights and privileges of others.

And perhaps as germain to this general subject it may be said that in the future rules should rigidly discountenance the practice of appearing on the printed program and then not appearing in person. There are two styles of delinquents in this class. The most reprehensible is the man who promises a paper and then absents himself without even sending his paper. The other is the man who, like the first, permits his name to appear on the program and then merely sends a paper for some one else to read and defend; or perhaps to be read by title, yet expecting it to appear in the published transactions. Of course, occasionally one may honestly anticipate being present and illness of himself or some member of his family may occur to prevent. Possibly exceptions might be made when the excuse for non-attendance is a valid one. Yet we might perhaps well pattern our conduct in such circumstances upon the rule of the American Medical Association, at whose meetings, in the absence of an essayist when called, a paper is passed; nor is it published with the transactions, not even illness being accepted as excuse for this transgression.

**Opening of
the Congress.**

The Congress was opened promptly at 1:30 P. M. on Monday, August 30th, the large Assembly Room being crowded. Addresses were made by State, City and Exposition officials, and responses were offered

by Dr. Frank L. Platt, President of the Dental Congress; Dr. Don M. Gallie, President of the National Dental Association; Dr. Truman W. Brophy, President Federation Dentaire Internationale; Dr. Burton Lee Thorpe, and by delegates from foreign countries.

Two incidents which occurred during the exercises were of special interest. One, the particularly warm greeting awarded to Dr. Florestan Aguilar, responding for Spain, who was the only European present who had risked crossing the war zone erected by Germany. During the course of his remarks, Dr. Aguilar called attention to the fact that because of the war, Dr. Truman Brophy and himself are now the only two men who have never missed attendance at an International Dental Congress.

The second moment of intensity was when Dr. Younger was unexpectedly seen to enter the hall. He was at once vociferously called for, but when compelled to step up onto the stage was so touched that in response all he could say was: "My friends, I am glad to be at home once more."

**Receptions
and Balls.**

On Monday evening there was a reception for all members of the Congress, with their wives, daughters, sisters and sweethearts, at the California Host Building, at the Exposition Grounds. The reception was followed by a grand ball, and the men with their women folk made an imposing company. A second ball of the same character was held in the same place later in the week on invitation of the Psi Omega Fraternity.

**Section
Meetings.**

The section meetings in the main were unusually well attended. Naturally, with ten sections in operation, it was not possible for one man actually to attend all or even many of the meetings, and it would therefore be exceeding bad taste to attempt any comparison of the values of the papers read. There was one, however, which the writer was fortunate enough to hear, to which he cannot refrain from calling special attention. This was a paper entitled "Chronic Peridental Infections—The Value of Blood Examination as a Diagnostic Aid," presented in Section VI by Dr. W. H. G. Logan.



During the past two years we have heard much, very much, about systemic disease caused by periapical and other oral infections, but it must be admitted that in spite of all that has been presented, no absolutely final proof has been produced. There has been much theorizing and many case histories have been recorded from which it appears to be a fairly safe presumption that there is a causal relation between oral infections and many systemic diseases.

Dr. Logan seems to have brought forward the most trustworthy evidence yet presented. In over a hundred consecutive (not selected) cases passing through his hands, where systemic disturbance has been accompanied by a mouth infection of some kind, he has made a blood examination before operating upon the mouth lesion. Subsequently, other blood examinations were made, and while it is impossible here to note all of his deductions, the important point is that with the clearing up of the mouth infection there has invariably been an improvement in the story disclosed by the blood. It would seem reasonable then to depend somewhat upon this method to determine whether or not one really has been successful in eradicating a mouth infection.

The Souvenir Program. Before closing this rather inadequate account of what was a really fine dental meeting, we must not overlook mention of the Souvenir Program.

This was indeed an *edition de luxe*. A volume of nearly two hundred pages, profusely illustrated in tone and tint, each page embellished with a beautiful border in ink of a color different from that used for the text, this was indeed an example of work of which the printer well may be proud.

The contents, too, containing as it does besides the programs of meetings, sections and clinics, many well written and exceptionally interesting articles on dentistry in various other parts of the world, in our own country, in our Army and in our Navy, reflect credit upon the committee and editor who compiled it.

In final conclusion, the dentists of this country owe the men of California a debt of gratitude for staging this exceptional meeting.



SINCE LAST RECORDING a talk Around the Table, I have chinned with
 ♦ the men from China, and chatted with the fellows from Chattanooga; I
 ♦ have dined with Fraters in Pullman diners, and supped with superior
 ♦ fellows from South America. In short, I have been to the Congress
 ♦ in Frisco. Later I shall have stories to tell, but first I must be fair
 ♦ to those members of the Club who have written to me during my
 ♦ absence, and the very first letter compels me to admit that I did not
 ♦ have the pleasure of hearing Dr. Horace Howe, of Boston, read his
 ♦ paper, entitled "Importance of Mouth Hygiene During Infancy and
 ♦ Early Childhood." Fact is, there were ten sections and over a hundred
 ♦ papers. Verbum Sap., as my Latin professor was wont to say when
 ♦ he had no better explanation.



REALLY, I AM CHAGRINED to think that I did not hear Dr. Howe's
 ♦ paper, because my correspondent asks me to discuss the subject. It
 ♦ seems that the *Boston Post* has had something to say, and my friend
 ♦ from Somerville, Mass., thinks the *Post* should not have the last word.
 ♦ On the sixth day of September the *Post* had this to say:



"THE STATEMENT THAT CANDY is as harmful to children as liquor
 ♦ is to an adult, reported to have been made by Dr. Horace L. Howe,
 ♦ of Boston at the Panama Pacific Dental Congress, was yesterday declared
 ♦ by Boston physicians to be absurd. Contrary to its being harmful to chil-
 ♦ dren, the eating of candy was said to be necessary for the proper growth
 ♦ of the child, and that good candy has no deleterious effects whatever.



"DR. THOMAS F. HARRINGTON, medical deputy of labor and industry,
 ♦ said that the eating of candy of good quality is as necessary for the
 ♦ sustenance of the growing child as any other form of food. 'Sugar is
 ♦ one of the most valuable and necessary forms of food in the develop-

♦ ment of the healthy body,' said Dr. Harrington. 'Of course, like every-
♦ thing else, the practice of eating candy can be abused, but eaten in
♦ moderation it can have no ill effect.'"

■ ■ ■

INTERRUPTING A MOMENT, I think the same can be said of whiskey.

■ ■ ■

"DR. DAVID D. SCANNELL, a member of the School Committee, said
♦ that in his opinion the eating of candy is entirely beneficial to children.
♦ He added that it is not the eating of candy that causes decay of the
♦ teeth, as was charged by Dr. Howe, but rather the neglect of proper
♦ care in keeping them clean."

■ ■ ■

MUST INTERRUPT the Post again to announce that the Forsyth Dental
♦ Infirmary will inaugurate a school for Dental Hygienists, beginning
♦ October 4th. This surely will please Dr. Scannell, of the School Com-
♦ mittee, because it is chiefly among school children that the dental
♦ hygienist will find her work. But the Post has more to say:

■ ■ ■

"A STATEMENT by Dr. Howe that no candy store should be allowed in
♦ the same neighborhood with a school any more than should a saloon,
♦ was declared by Dr. Francis D. Donoghue to be entirely inconsistent.
♦ 'There is a definite and tremendous danger in liquor, and to attribute
♦ a like danger to candy is absurd. Candy is the least of the sources of
♦ danger to children. From a physiological viewpoint, candy, or some
♦ other form of sugar, is absolutely necessary to the welfare of the child.'"

■ ■ ■

VERY TRUE, AND VERY LIKELY if all candy were all sugar, and if
♦ candy were administered to the child in physiological doses, the results
♦ might be entirely physiological. It is quite true that the child must
♦ have his quantum suf. of sugar, but as he gets sugar in tea, in coffee,
♦ on cereals in the morning, and in pies and puddings after dinner, not to
♦ mention the jam on his biscuit at night, is it not just possible that candy,
♦ if restricted even to purest sugar, which it seldom is, might provide the
♦ youngster with more saccharin material than is physiologically required?

■ ■ ■

HOWEVER, IT IS NOT my purpose to reply to the learned M.D.'s. from the
♦ Hub, but rather to invite others better informed than I to do so. Still,
♦ I may repeat an old epigram, which must have at least a grain of sense
♦ in it, else it could not have lived to such a respectable old age.

■ ■ ■

THE EPIGRAM READS THUS: "When there is a liquor saloon on one
♦ corner, and a candy store in the middle of the block, it is quite natural
♦ to find a drug store at the other corner."

■ ■ ■

DR. FREDERICK J. SHADDOCK, of Rochester, writes as follows: "In
♦ the August issue Dr. L. H. Gilbert describes a method of cutting sen-
♦ sitive cavities with less pain, saying: 'The major part of the pain is
♦ produced by the frictional heating up of the bur'; and his method is
♦ to play a stream of cold water upon the bur while operating, the saliva

❖ ejector drawing off the surplus. Yes! Good! But there is a little more scientific way. My preceptor, Dr. R. H. Hofheinz, lectured to me twelve years ago in college regarding bur heat, and declared that sharp burs produce less heat than dull ones. Also that by occasionally dipping the bur in carbolic acid, and then using it in the cavity, we have the bur lubricated to the extent of preventing much friction, surely less than when using water, carbolic being an oleum. Moreover, the protoplasmic contents of the tubuli which conduct the pain being coagulated by the carbolic, we reduce the sensitiveness to the minimum, have our field of operation constantly sterile, the infected area well disclosed by the carbolic, and all the time be freer in our work than if using a spray, causing water to splash all around."



ON THE SAME SUBJECT, Dr. Frank Bliven, of Worcester, Mass., contributes the following comments for the delectation of the fellows:

❖ Around the Table: "After reading Dr. Gilbert's method of using a stream of cold water upon the bur, I think that would be a very safe place to use it, for I am confident if it was put into the cavity of some of my patients the landlord would have to repair the roof; besides I see no necessity of keeping the bur cool. A sharp bur at high revolution and the impact no harder than is necessary to cut and clear will prevent the bur from heating. To the best of my knowledge I am the first man in this country to run a dental engine by electricity successfully, and have used as high as 7,500 revolutions a minute, and, as the saying goes, 'The higher the fewer.' For excavating sensitive dentine I found this to be a very practical degree of speed, but pretty hard upon the hand-piece and difficult to obtain in the motors manufactured to-day. I had mine wound especially for 5,000 revolutions, which is considerably higher than those generally in use. I find there are a few men who appreciate the value of high speed and trust these words will quicken a few others to experiment with it for the benefit of the suffering public.



"**SOME MONTHS AGO** I purchased a Rogers High Frequency outfit and have been able with it to reduce cavity sensitiveness to a point within the limits of comfort by applying the current to a piece of cotton saturated with carbolic acid from one minute to a minute and a half. Patients have frequently expressed their relief and have stated they did not think they could have had the tooth excavated without it. I kept an analgesia outfit in the office for six months, and finding no use for it I was very glad to dispose of it with a loss of only ten dollars. As Tokio says, 'Wish you the same.'"



AFTER DESCRIBING Dr. Gilbert's scheme in the August number, I introduced the following paragraph, repeated there because of a comment it has brought forward:



"**ANOTHER LITTLE METHOD** of which Dr. Gilbert's proposal reminds me is accomplished with a device constructed by Dr. Van Woert. By

♦ the way, that Van Woert person has a lot of good ideas. In this particular case he has a tiny metal tube soldered to his handpiece in such a manner that the end of the tube is directed toward the bur. To the other end of the metal tube is attached a small rubber tubing leading to the compressed air outfit. When using the bur, the compressed air is turned on and a stream of cold air keeps the bur and tooth cool and the cavity clear of dust."



IN REGARD TO THE ABOVE, Dr. C. Edmund Kells voices his views as follows: "Yes, Van Woert has a lot of good ideas, many of which are original, but the one you report happens to have been originated by Yours Truly in 1886, and published in 1887. How is that for ancient history? See Johnson's Text Book, second edition. And here is a secret; don't divulge it. I got up the stunt, it is true, but it is not worth a cuss." (My! My! And cusses so cheap these days, too!) "I used it a short time only. An assistant operating the air stream is a thousand times better proposition."



NOW IT IS ONLY FAIR to Dr. Van Woert to admit that he never told me the little appliance was original with himself. Every time I go to his office he has some new and useful device, and as he makes them all himself, I just naturally take it for granted that he originates them. He does, most of them. As to the utility of the scheme, I just thought it must be good, or Van Woert would not be using it. Never tried it myself.



WHILE WE ARE DISCUSSING the general subject of operating on sensitive cavities without pain, I may as well introduce here a communication from Dr. Josef Novitsky, of San Francisco, who writes as follows: "In view of the fact that some interest will undoubtedly be aroused in obtunding pastes by your publishing of Dr. Buckley's paper in the December 'Items of Interest,' I would like to call attention to a formula that I worked out four years ago and have been using in my practice with great success ever since. I communicated the formula to the San Francisco District Dental Society in open meeting on May 12, 1913—a year and a half before Dr. Buckley's paper appeared. It was published in the *Pacific Dental Gazette* of September, 1914. This, you will observe, was still thirty days before Dr. Buckley's address before the New York Society. In the meanwhile, the formula had been offered to Dr. Kirk, of the *Cosmos*, for publication on July 23, 1914. The formula is as follows:

♦ Urea Hydrochloride and quinine.....	gr. 20
♦ Parafomaldehyde	gr. 15
♦ (The latter should be 20 grains instead of 15 grains if strong action is desired.)	
♦ Thymol	gr. 20
♦ Zinc Oxide	gr. 60
♦ A little of the 'putty' is sealed in the cavity for from one to three days, after which the tooth is quite insensitive. It will be seen that this is very similar to the mixture used by Dr. Buckley. It does not conflict with the Harrison Narcotic Law and has the great advantage of cheap- ness. Time and experience will have to decide whether the substitution of neothesin for quinine urea is of any advantage."	



Cracking Nuts with the Teeth.

Editor ITEMS OF INTEREST.

Dear Sir:

I beg of Reginald Sayre, M.D., the privilege to comment on his "Criticism of a Mouth Hygiene Educational Film," which appeared in the July issue.

Harking back to boyhood days, I recall that the school text-book, under care of the teeth, warned us not to crack nuts with our teeth, nor to pick them with pins. However, I have yet to see a sound tooth which has been injured in either way. The experience of dental practitioners generally is similar.

This question of nut-cracking has been exalted to a position of importance in the minds of the laity, when, in truth, as a factor in tooth destruction it is well-nigh negligible.

Dr. Sayre is correct in his inference that "if you kept your mouth clean and your teeth in good condition you would be enabled to crack Brazil nuts." You would, with "impunity" or otherwise. This is not to say that it is wise or desirable to use our teeth as nut-crackers, but to emphasize the fact that the underlying fallacy is the presumption that Nature has provided us with masticatory muscles so powerful as to be able to crush the teeth, rather than the truth that Nature's equilibrium endows us with teeth so strong as to withstand any stress—barring accidents, and they are rare—that the muscles of mastication can put upon them.

We have no tales of broken teeth among our aboriginal Indians, yet I doubt not but that they exercised them on hickory nuts and venison and buffalo bones. Where one tooth is injured by the nut-cracking practice, thousands invite decay and destruction by the lack of vigorous use. Bakers' bread, for instance, which forms a gummy mass that adheres to teeth accustomed to genteel and indifferent mastication, does more toward injuring the teeth than all the nuts on or off the market.

It is not misuse, but disuse that constitutes the greater evil. The tooth that fears the cracking of a pecan, or even a Brazil, has much need of floss and toothbrush. The slogan that "a clean tooth never decays" should be antecedent by "an unused tooth seldom is clean."

J. W. PEROUTKY, D.D.S.

Treatment of Impacted Third Molars.

Editor ITEMS OF INTEREST.

Dear Sir:

I have just finished reading the very interesting article, "Wisdom Teeth," by Dr. John D. Thomas, of Philadelphia, which appeared in the August number of ITEMS OF INTEREST. I am in accord with his paper up to his classification of the wisdom teeth, and really I have no fault to find with that; in fact, I think it is a distinct advantage to have the various ramifications of this most troublesome tooth classified, and it is the first time to my knowledge that I have seen them thus qualified; but it is with his treatment of these variously impacted teeth that I most thoroughly disagree. The ruthless manner in which the Doctor speaks of extracting the second molar to get relief from an impacted third molar is appalling. Every dentist knows that there is very small probability of a deflected or impacted third molar righting itself as the result of the extraction of the second molar; in truth, the very reverse is more than likely to be the result, and the patient by this procedure secures relief from pain, but loses two molars instead of one. Of course, it requires skill to remove a badly impacted third molar, and the removal of a great many of them might be and are rightfully classed as "major surgery," but this should not deter the exodontist who is not willing that his work should be so circumscribed that he becomes a mere puller of teeth. My experience has been that the general surgeon is very glad to turn this work over to the dentist who can do it, and my observation has been that the exodontist who is willing to prepare himself in all phases of the surgery and anesthesia required will do better work than the general surgeon for several reasons:

- 1st. He is better able to recognize and diagnose dental lesions.
- 2nd. Because he is making a specialty of that branch of oral surgery.
- 3rd. Because he places a higher value upon the teeth and their surrounding tissues.

This last reason has been forced home to me upon more than one occasion by the presentation of patients who had gone to general sur-

geons to have impacted wisdom teeth removed and had had almost everything else in the oral cavity removed but the wisdom tooth.

I have seen the general surgeon make major surgery out of a simple alveolar abscess. I have seen him also go through the cheek to reach a dental cyst in the antrum that might have been cured by the removal of some badly decayed roots of teeth and the subsequent drainage thereof. This, of course, is no worse probably than the dental surgeon would do who attempted to practice gynecology. Why, then, should the dentist who professes to make this work a specialty send it to one who does not.

Neither do I agree with the Doctor that impacted teeth are the innocent sojourners in a weary land that he represents them to be. We have abundant clinical evidence to prove that they may be the cause of headache, neuralgic pains in the eye, ear and head, chorea, epilepsy, hemiplegia and other forms of paralysis and degeneracy. And the exodontist who couples this knowledge to his experience and skill becomes a diagnostician, a valuable aid and co-worker with the physician and general surgeon, and not a mere puller of teeth "and easy ones at that, too."

DR. W. I. JONES.

Columbus, Ohio.





Dr. Greene Vardiman Black.

Dr. G. V. Black died at Walnut Lodge, his boyhood home, at 4 P. M., Tuesday, August 31st. His long and useful life covered a period of seventy-nine years, and for more than a half century he devoted practically his entire thought and energies to the development of the scientific and practical problems of dentistry.

The death of Dr. Black was caused by pernicious anæmia, with which he had been afflicted for some time. While spending the summer in Duluth, Minn., his condition became worse. During a visit of his son, Dr. Carl E. Black, he expressed a great longing once more to visit the scenes of his childhood, and so Dr. C. E. Black took his father with him to the farm home southeast of Virginia. This was Tuesday, August 17th, just two weeks before he died. For a time after his arrival at the home the aged invalid seemed to improve, but later his condition became critical, and it was thought best to notify the absent members of the family.

Dr. and Mrs. Arthur D. Black, their son Gilmer, and Miss Clara Black were all in California at the time of receiving the telegram concerning their father's condition, and hastened at once to his bedside. For several days preceding the death of Dr. Black all the members of his family were with him.

Greene Vardiman Black was born in Scott County, Illinois, near Winchester, August 3, 1836. He was the son of William and Mary Black, and a great-grandson of Capt. William Black, an officer of the militia in North Carolina just before the Mecklenberg Rebellion, and one of the first officers to refuse to take the oath of allegiance to the British crown. The father of Dr. G. V. Black was born in Milledgeville, Ga., in 1796. In 1825 he went to Tennessee, and there was married to Miss S. Vaughn, removing to Scott County, Illinois, about nine years later. After residing for ten years in Scott County, in which period the subject of this sketch was born, the family removed to Cass County, settling seven miles southeast of Virginia, on the farm that has ever since been

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associated with the family name, and where Dr. G. V. Black passed the last few years of his life.

The boyhood of the deceased was passed on his farm in Cass County, and it was always a dear spot to him. Many of his summers were passed there during his long professional career. Last year he was there for several weeks, and it was with great reluctance that he left in the fall for his home in Chicago.

At the age of sixteen Dr. Black left the farm for a time and made his home with his brother, Dr. T. G. Black, of Clayton, Ill., who served as lieutenant-colonel in the Civil War, and was twice elected a member of the State Legislature. With him the younger man read medicine, and for a time served as postmaster of the village. At the age of twenty-one he began the study of dentistry with Dr. J. C. Speer, of Mt. Sterling. Afterward he established a dental office in Winchester, where he remained in the practice of his profession until 1862. In 1860 Dr. Black was married to Jane L. Coughennower, who died August 26, 1863. In 1865 he was married to Miss Elizabeth Akers Davenport, who survives him, together with the following sons and daughters: Dr. Carl E. Black, of Jacksonville; Miss Clara Black, of Chicago; Dr. Arthur D. Black, of Chicago, and Mrs. Mark Baldwin, of Duluth, Minn.

Dr. Black served in the Union Army during the Civil War with the rank of sergeant, and was engaged most of his time on special scout duty. He received an injury to one of his knee joints while in the service, which kept him for six months in a hospital in Louisville, Ky.

In 1864 Dr. Black opened a dental office in Jacksonville, and at first applied himself to the study of chemistry, establishing a complete working laboratory in connection with his dental office. He organized a class in chemistry among the public school teachers of the city, which he taught several years. He also took a prominent part in the medical organizations of the city and county.

Dr. Black, even in the earlier years of his professional career, became known as an author and lecturer on scientific topics pertaining to dentistry. Since then he has become world-renowned, and his writings have been translated into many languages and are standard authorities on the subjects which they discuss. A prominent feature of all of Dr. Black's writings are the numerous original drawings they contain.

Banquet in His Honor.

In recognition of his distinguished services to the dental profession, a banquet was given in Dr. Black's honor January 29, 1910, in the gold room of the Congress Hotel in Chicago by the Chicago

Dental Society. At this assemblage four hundred representatives were present from Canada, Europe, South America, Australia, and every part of the United States, to do him homage.

In experimental work, in invention, as the author of hundreds of pamphlets and books, Dr. Black can truly be said to have accomplished more for dental science than any other one man. At the banquet in 1910 the guest of honor was called upon last, and in a characteristic, modest way, framed his thanks briefly to the men who had gathered to do him honor. In closing he gave expression to the chief thought that was in his mind, when he said that he did not have a good-bye for his friends, but rather a good-night. He said, though he had passed the mark of three score and ten, that he did not believe that his work was over—that there were many things in his mind that ought to be done, and that he hoped he might be able to do them. "I love the work I have been doing and I am not ready to quit." And so was given to him the years following that night to accomplish still other great things for the profession to which he had unsacrificingly devoted the best years of his life.

In addition to his work as a writer and teacher,
A Leading Inventor. Dr. Black was an inventor, and it was he who designed and patented one of the first cord transmission dental engines. The present method of preparing cavities in teeth, and the methods of inserting and making gold and amalgam largely resulted from his investigations. For more than a quarter of a century he has stood pre-eminent as an original worker, and his name is known among dental and medical men the world over. For a period of ten years ending in 1880 he lectured on Pathology, both general and dental, in the Missouri Dental College in St. Louis. Subsequently, from 1886 to 1889, he lectured in the Chicago College of Dental Surgery; then he became identified with the dental department of the University of Iowa, from which position he was called to Northwestern University, and was made the Dean of the dental department in 1897.

Dr. Black was the first President of the State Board of Dental Examiners in Illinois; served as President of the Illinois Dental Society and the American Dental Association, and for a long period of years represented Northwestern University in the American Association of Dental Faculties. He was president of the section on pathology of the International Dental Congress during the World's Fair in St. Louis, also of the Panama-Pacific Congress, now in session in San Francisco.

He was awarded the first gold medal by the Dental Society of the State of New York for scientific research, and also the first Miller prize, the latter being a gold medal voted by the International Dental Federa-



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tion for the most valuable contributions to the literature and scientific advancement of the profession. Dr. F. Aguillar, of Madrid, was commissioned to come to Chicago to make the presentation in person.

Dr. Black was so wrapped up in his work, so intent on the great things that he was accomplishing, that he had no thought of material gain or personal aggrandizement. His purpose was to solve unsolved problems in science, to perfect methods and apparatus, and to develop theories that they should become practical aids to the dental profession and thus to humanity. His work was for all men, and with singular self-forgetfulness he gave unsparingly of his time and his great mentality for the world at large. While his work was such that he came to be a recognized dental authority the world over, his simple habits of life and the kindly approachableness of his manner never changed.

The stories of his deep and unassumed interest in young and struggling practitioners are many, and he had that quality of heart gentleness that marks many men who are really great. His long life has closed; he has not lived in vain, and no monument could be erected in his memory which could give half the glory to his name that will come through the years from the recollection of his work. The mere statement that he contributed largely to the text-books and literature of dentistry conveys little idea of how large his contributions have been in this line. A list of pamphlets and books from his pen was compiled several years ago, and occupied twenty pamphlet pages. He began writing in 1866, and from that time dental treatises came steadily from his pen, his activity in this line continuing until but a few months ago.

A Physician's Tribute.

Referring to Dr. Black several years ago, an eminent physician in Illinois said: "In the history of a people, men are born whose wisdom and logic command attention, and they are chosen to guide the ship of state and to shape the destiny of a nation. The sons of Illinois have always been active in every field of human endeavor. In statesmanship, the name of the immortal Lincoln stands supreme. The lives of Grant and Logan have added lustre to the history of the State, and their fame is the nation's glory. The legal profession gave us Chief Justice Fuller. In theology, the logicians, David Swing and H. W. Thomas, were towers of strength. In medicine, the successful organizer and profound scholar, N. S. Davis, ranked among the foremost physicians of his time. In surgery, the incomparable Senn was the light of the world, a benefactor to mankind."

"On August 3, 1836, in Scott County, Ill., a boy was born who was destined to become a leader of men, to delve deep into unsolved problems,

and to bring blessings not only to the people of his time, but to all generations yet to be. Unmindful of his own well-being, and filled with the desire to alleviate human suffering, he worked day and night. The results of his efforts the world knows and appreciates. What Lincoln was in statesmanship; what Grant was at the head of the army; what Melville Fuller was as the Chief Justice of the United States; what N. S. Davis was in medicine; what the master surgeon, Senn, was in surgery, in the science and art of dentistry is that distinguished man, Dr. G. V. Black. In recognition of his services as a teacher, writer, investigator, scientist, and as a lover of humanity, we may place our wreaths of laurel at his feet."

Another said of him: "We need not discuss the work of Dr. Black, for, after all, the greatest achievement is that he has left his impress upon dentistry by the intellectual uplift he has given us in enabling us to understand and appreciate the scientific method as applied to our work. Dr. Black's life work is his honor, and we can but express our appreciation of what he has done for us and say, God bless him for what he has done, not only for the dental profession, but for the uplift, for the help, for the benefit that he has conferred upon humanity at large."

Dr. Black was given the degree of D.D.S. by Missouri Dental College in 1877. In 1884 he received the M.D. degree from the Chicago Medical College, and in 1892 Sc.D. from Illinois College, and LL.D. from Northwestern University in 1898.

As a man he was really the marvel of the age, for in his lifetime he accomplished more perhaps than can be accredited to any other one man in the dental profession. It was, indeed, a great day for dentistry when Dr. Black was born, and when one contemplates the vast amount of work that he has done, it seems almost beyond comprehension that so much was accomplished even through the long years of his devoted work.

The following are the leading events of the life and professional career of Dr. Greene Vardman Black as complied several years ago:

Born near Winchester, Scott County, Ill., August 3, 1836.

Family moved to farm seven miles southeast of Virginia, in Cass County, Ill., in 1845.

Attended country school about three months each winter.

Studied medicine with Dr. Thomas G. Black, a brother, at Clayton, Ill., 1853-1856.

Studied dentistry with Dr. J. C. Speer, Mt. Sterling, Ill., 1857.

Practiced dentistry at Winchester, Ill., 1858-1862.

Enlisted in 129th Illinois Volunteers, 1862.

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In hospital at Louisville, Ky., six months, and discharged for disability 1863.

Practiced dentistry in Jacksonville, Ill., 1864-1870.

Joined Missouri Dental Society, 1866.

Joined Illinois State Dental Society, 1868.

First important dental paper on "Gold Foil" read before Illinois State Dental Society, 1869.

President Illinois State Dental Society, 1870-1871.

Invented one of the first cord-driven, foot-power dental engines, 1870.

Lectured on pathology, histology and operative dentistry, Missouri Dental College, 1870-1880.

First President of the Illinois State Board of Dental Examiners, 1881-1887.

Wrote book, "The Formation of Poisons of Micro-organisms," 1884.

Professor of Dental Pathology, Chicago College of Dental Surgery, 1883-1889.

Introduced teaching of dental technics, Chicago College of Dental Surgery, 1887.

Wrote for the American System of Dentistry, chapters on "General Pathology," "Dental Cares," "Pathology of Dental Pulp," and "Diseases of the Peridental Membrane," 1886.

Wrote book, "Perosteum and Peridental Membrane," 1887.

Voted life membership in Illinois State Dental Society, 1889.

Professor Dental Pathology and Bacteriology, dental department, University of Iowa, 1890-91.

Wrote book, "Descriptive Anatomy of the Human Teeth," 1891.

Wrote series of articles, entitled "The Management of Enamel Margins," *Dental Cosmos*, 1891.

Professor Dental Pathology and Bacteriology, Northwestern University Dental School, 1891-97.

Chairman of Section on Etiology, Pathology and Bacteriology, World's Columbian Dental Congress, 1893.

Report on Dental Nomenclature, World's Columbian Dental Congress, 1893.

Wrote series of articles, entitled "An Investigation of the Physical Characters of the Human Teeth in Relation to Their Diseases and to Practical Dental Operations, Together With the Physical Characters of Filling Materials," *Dental Cosmos*, 1895-96.

Dean and Professor of Operative Dentistry, Dental Pathology and Bacteriology, Northwestern University Dental School, 1897, to the time of his death.

President National Dental Association, 1900.

Awarded First Fellowship medal by the Dental Society of the State of New York, 1905.

Special guest at annual meeting of American Dental Society of Europe, 1906.

Wrote work on "Operative Dentistry," in two volumes, 1908.

Voted Miller prize for most valuable contribution to dental science and literature by the International Dental Federation, 1910.

Wrote book on "Special Dental Pathology, 1915.

Funeral Services. At the cemetery, with a very simple service, Dr. Black was laid away for his long sleep in a grave massed with beautiful floral emblems testifying to the tender esteem of friends from near and far. The

honorary bearers were Dr. Edmund James, President of the University of Illinois; Dr. W. A. Harris, President of Northwestern University; Dr. J. H. Kennerly Dean of the dental department of Washington University in St. Louis; Dr. C. R. Koch and Dr. Edward Noyes, of Northwestern University; Dr. Thomas L. Gilmer, of the Northwestern Dental School, and a friend of Dr. Black since boyhood. The active bearers were Dr. E. F. Baker, representing local medical practitioners; W. E. Veitch, representing the Jacksonville Literary Union; Dr. C. B. Sawyer, representing the Jacksonville Dental Society; A. T. Capps, representing the family; Dr. George N. Kreider, long associated with the deceased, and Dr. Charles H. Rammeikamp, representing Illinois College.

Flowers and floral emblems were sent in great profusion by friends of Dr. Black from a number of distant cities, and seldom, if ever, has such a display been seen in Jacksonville. The flowers were cared for by Mrs. W. T. Wilson, assisted by Dr. Josephine Milligan, Dr. Grace Dewey, Mrs. James O. Vosseller, Mrs. J. W. Walton, and Mrs. John H. Russell. The ushers were W. T. Wilson, Dr. W. B. Young, and Dr. W. L. Frank.

Dr. George W. Melotte.

Died, after a brief illness, July 25, 1915, George Melotte, M.D.S., of Ithaca, N. Y., in his eightieth year.

Dr. Melotte had been in failing health for some time, and was compelled to retire from active practice about eight years ago. Although the infirmities of advancing age were beginning to tell upon him, the sudden end, with only an hour's illness, was unexpected.

Born in Watertown, a son of Gabriel Melotte, a native of France, he was educated in the Jefferson County Institute, practiced his profes-



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sion with Dr. S. M. Robinson, at Watertown, moved to Potsdam, where he practiced five years, coming from there to Ithaca in 1866.

In 1887 Dr. Melotte was awarded the title of Master of Dental Surgery by the N. Y. Board of Regents. He was a delegate of the United States to the International Medical Congress, section of dentistry, at Berlin in 1890, and there acted as a clinical demonstrator. While in Europe he gave clinics in Paris and London and before the British Dental Association at Exeter, demonstrating crown and bridgework. Just before his health broke he had accepted the appointment of dean of the Dental College of Iowa State University.

It was as an inventor of dental appliances that he became known throughout the dental world. This reputation was due to a natural mechanical talent. He gave to the dental world fusible metal and Melotte's mouldine. A company was formed and these inventions were placed upon the market through one of the largest dental supply houses in the country. For many years he was active in the Sixth District Dental Society.

In Ithaca he was a leader in several fraternal orders and in St. John's Episcopal Church. While in Potsdam he affiliated with Racquet River Lodge No. 213, F. and A. M., afterward transferring to Fidelity Lodge No. 51, in Ithaca, and joining Eagle Chapter No. 58, R. A. M., in 1867, St. Augustine Commandery No. 38, and Ithaca Lodge of Perfection. For nearly thirty years he was prelate of the commandery, and 1890 served as its eminent commander.

Said the *Weekly Ithacan*: "Dr. Melotte's practice in dental surgery was, in method and appliances, in advance of his time, his contributions to the profession winning him fame and favor throughout the State and nation.

"Dr. Melotte was a public-spirited, good and useful citizen. He was not only a leader in the professional life he had chosen, but was ever an uplift in the social, political and religious life of the community. There has been none like him, 'only one Dr. Melotte,' as has been truly said. He will be missed by those who knew him best."

From the *Elmira Telegram*: "He was one of the foremost dentists living until his health drove him to private life and from the world several years ago. He was by nature a gentleman. He was very high in Masonry and an intensely active and sincere Episcopalian. He had a heart as tender as a female saint and as big as a man can carry. Few men in Ithaca were held in such high esteem. He was a good man. 'God bless him.'"

He was also prominent in Odd Fellows' circles, having served as Noble Grand of Ithaca Lodge No. 71, and Chief Patriarch of Iroquois Encampment No. 16. In St. John's Episcopal Church he served for twenty-seven years as vestryman.

His funeral was conducted by St. Augustine Commandery No. 38.

Three daughters, Mrs. J. P. Hale Armstrong, of Minneapolis; Miss Julia L. Melotte and Miss Addie J. Melotte, of Ithaca, N. Y., survive.

F. M. WILLIS.





State Society Meetings.

ARIZONA STATE DENTAL SOCIETY, Phoenix, Ariz., November, 1915.

Secretary, Dr. J. L. O'Connell, Phoenix, Arizona.

OHIO STATE DENTAL SOCIETY, Columbus, Ohio, December 7-9, 1915.

Secretary, Dr. F. R. Chapman, 305 Schultz Bldg., Columbus, Ohio.

VIRGINIA STATE DENTAL ASSOCIATION, Richmond, Va., Nov. 4-6, 1915.

Secretary, Dr. C. B. Gifford, Norfolk, Va.

Northern Illinois Dental Society.

The twenty-eighth annual meeting of the Northern Illinois Dental Society will be held the third Wednesday and Thursday of October in Freeport.

All dentists in Northern Illinois who have not been fortunate enough to have attended the Panama Pacific Dental Congress may find consolation in attending our meeting. Cross the days in your appointment books. Do it now.

H. F. BOWERS, Secretary.

Lebanon Valley Dental Association.

The fortieth annual meeting of the Lebanon Valley Dental Association will convene in Lebanon, Pa., on Tuesday and Wednesday, October 12th and 13th.

E. F. KREMER, D.D.S.

Chairman of Executive Committee.



Louisiana State Dental Society.

At the thirty-seventh annual meeting of the Louisiana State Dental Society, held in New Orleans for the first time in seven years, the following members were elected to serve during the 1915-1916 term:

J. Hall LeBlanc, President; L. C. Dumpsey, First Vice-President; H. H. Hawsey, Second Vice-President; J. Crimen Zeidler, Recording Secretary; Robert L. Carter, Corresponding Secretary; O. J. Ory, Treasurer.

This meeting was the most auspicious and largest attended in the history of the organization, and much credit is due the retiring president, Dr. J. P. Wahl, for his untiring and zealous efforts, which were largely responsible for the success attained.

Lake Charles, Louisiana, was selected for the meeting place of the society in 1916.

DR. J. CRIMEN ZEIDLER, Secretary.

Vermont State Dental Society.

The Vermont State Dental Society held a very successful meeting in Burlington, Vt., May 19 and 20, 1915, at which the following officers were elected by the society:

Dr. W. H. Megoff, President, Montpelier; Dr. H. M. Smith, First Vice-President, Lyndonville; Dr. G. E. Partridge, Second Vice-President, Burlington; Dr. P. E. Mellen, Secretary, Middlebury; Dr. W. H. Munsill, Treasurer, Wells River.

Executive Committee—Dr. W. R. Pond, Rutland; Dr. David Manson, Burlington; Dr. P. M. Williams, Rutland.

New Jersey State Board of Registration and Examination in Dentistry.

The State Board of Registration and Examination in Dentistry of New Jersey will hold their semi-annual meeting and examination in the Assembly Chamber at the State House, Trenton, N. J., on December 6, 7, 8, and 9, 1915. License fee, \$25. Re-examination fee, \$10.

The following practical tests will be required: Insertion of an approximal gold filling, compound approximal amalgam filling, and a silicate filling, besides a practical test of the applicant's ability in oral prophylaxis. Also preparation of a cavity for an inlay with wax pattern. Prosthetic dentistry: Five-piece bridge and Richmond crown in addition

to an anatomical articulation of a full upper and lower set of teeth. Teeth to be furnished by applicant. Wax bites properly trimmed and in place on models for inspection before setting up teeth.

Attention is directed to the following requirements: "All applicants for a license to practice dentistry in New Jersey shall present to said board a certificate from the Superintendent of Public Instruction showing that before entering a dental college he or she had obtained an academic education, consisting of a four-years' course of study in an approved public or private high school, or the equivalent thereof." In accordance with the law, the Secretary will issue application blanks only upon presentation of the required certificate from the Superintendent of Public Instruction, Trenton, N. J.

Applications must be filed ten days before the date of the examination. Address all communications for further particulars to the Acting Secretary.

JOHN C. FORSYTH.

430 East State Street, Trenton, N. J.

Maryland Board of Dental Examiners.

The Maryland Board of Dental Examiners will meet for examination of candidates for certificates on November 4th and 5th, 1915, at the Baltimore College of Dental Surgery, Baltimore, at 9 A. M.

For application blanks and further information, apply to

F. F. DREW, Secretary.

701 N. Howard Street, Baltimore, Md.

Notice of Registration.

To All Dentists Licensed in the State of Illinois.

You are hereby notified to procure from O. H. Seifert, Secretary of the Illinois State Board of Dental Examiners, with offices located at 305-6-7 Ridgely Bldg., Springfield, Illinois, a renewal of your certificate of registration to practice dentistry in the State of Illinois from and after November 1, 1915, and until November 1, 1917, and that the fee therefor is \$1.00 (One Dollar), which must accompany the application for renewal.

You are further notified that unless you procure a renewal of your registration certificate on or before November 1, 1915, your license to practice dentistry in the State of Illinois will be revoked in accordance with the statute in such cases made and provided.

ILLINOIS STATE BOARD OF DENTAL EXAMINERS.

O. H. SEIFERT, Secretary.

Maine Board of Dental Examiners.

The Maine Board of Dental Examiners will hold an examination at the State House, Augusta, Maine, October 21, 22 and 23, 1915.

For application and information apply to Dr. I. E. Pendleton, 54 Pine Street, Lewiston, Me.

Michigan State Board of Dental Examiners.

The next regular meeting of the Michigan State Board of Dental Examiners, for the examination of applicants who wish to practice dentistry in Michigan, will be held at the dental college at Ann Arbor, beginning Monday, November 1, 1915, at 8:00 A. M., and continue through Saturday, November 6th.

For application blanks and full information apply to

A. W. HAIDLE, Secretary.

Negaunee, Mich.

American Institute of Dental Teachers.

At the last annual meeting of the American Institute of Dental Teachers, held at Ann Arbor, Michigan, the following officers were elected for the ensuing year: President, H. M. Semans, Columbus, Ohio; Vice-President, S. W. Bowles, Washington, D. C.; Secretary-Treasurer, J. F. Biddle, 517 Arch Street, N. S., Pittsburgh, Pa.; Executive Board, A. W. Thornton, Montreal, Canada; R. W. Bunting, Ann Arbor, Michigan; A. D. Black, Chicago, Ill.

The next annual meeting will be held at Minneapolis, Minnesota, January 25, 26, and 27, 1916.

Association of Military Dental Surgeons.

The annual meeting of the Association of Military Dental Surgeons will be held at San Francisco, September 1 and 2, 1915.

DR. WM. C. FISHER, President.

373 Fifth Avenue, New York City.



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Notification of change in address should be made on or before the 10th of the month, in order to have change made in time for the following month's issue.

Address all business communications to Consolidated Dental Mfg. Co., Publishers, Nos. 130, 132, 134 Washington Place; 187, 189, 191 West Fourth St., New York.

Communications for publication department should be addressed to the Editor, R. Ottolengui, M.D.S., D.D.S., LL.D., 80 West 40th St., New York.



Root Canal Filling.

By FORREST H. ORTON, D.D.S., St. Paul, Minn.

The editorial in the March issue of ITEMS OF INTEREST challenges my interest to the degree of calling forth a reply from me, not with the hope of answering the question, but with the desire to express my opinion upon a problem of grave importance. I say that I do not hope to answer the editorial. I believe that our limited knowledge of the many factors involved in a scientific consideration of the matter precludes the possibility of a satisfactory answer at this time.

I heartily commend the title of the editorial, "The Greatest Problem of the Day in Dentistry." I will go one step further and say that if only a small percentage of the serious systemic ills credited to the teeth are really traceable to them, then this is not only "The Greatest Problem of the Day in Dentistry," but a very serious problem for the general public as well.

It is unquestionably true that any method of treating root canals that does not consider the pecuniary point of view will be much restricted in its application. It is likewise true that a technique requiring a high degree of skill and accuracy will also be restricted in its application. But I believe thoroughly that the average dentist is both willing and



anxious to do whatever is necessary to be successful. He wants to be fair both to himself and to his patient. The trouble is that he finds himself in the situation of not being able to acquire the knowledge needed to do the best work. Observation and experience are not enough; accurate knowledge, based upon unimpeachable statistics, is imperative. Let us have less vociferation and more verification.

On the other hand, a review of the recent literature dealing with the problem of root-canal treatment, with its apparently convincing array of statistics, is almost enough to lead one to conclude that

Imperfect Statistics. we have accumulated and classified sufficient knowledge on the subject. The difficulty, however, is likely to arise in the interpretation of statistics. A recent writer, one who has been heralded as an authority on the subject under discussion, states that ten per cent. of the teeth, present mechanical or other obstructions which render any attempt to clean and fill them to the apical foramen, either inadvisable or impossible. Just what these statistics mean is left to be determined. Whether this authority has arrived at this conclusion from an intimate knowledge of the roots of the thirty-two teeth contained in a normal arch, or otherwise, is not made plain. Even if this were his method, a study of the morphology of the root canals might reveal some startling variations and anastomoses that would not be suspected from the external appearance of the roots. Perhaps this ten per cent. is a record of the teeth he has failed to treat successfully by the painstaking method described; or perhaps it is a tentative opinion.

Another writer from my own neck of the woods has created some consternation, not alone among dentists, but among general practitioners as well, by the announcement that of "1,000 teeth examined by him, seventy-one per cent. showed well-defined abscesses." He states further that "our surgery in pulp removal and root filling has nothing to do with its causation except to create an area of lowered resistance, thereby encouraging colonization of bacteria already afloat in the blood stream; that blind abscess is not primarily a dental disease, but is of hematogenous origin, and therefore a secondary lesion."

These conclusions are generally regarded as having only a speculative value as yet. The weak point in the statistics given is the absence of any previous history; that is, what per cent. of these blind abscesses were present at the time the teeth were treated and filled, and what per cent. of these teeth were filled under ordinary aseptic conditions? Other writers on this subject have stated that from fifty to ninety per cent. of the root canals filled were not filled to the apex. General accusations

such as these should not, in my opinion, receive serious consideration unless writers accompany their statements with full particulars of how their statistics were obtained and how interpreted. Statements are only incontestable upon such a basis as this; and it is time that dentists employed this method.

**Examination of
Tooth Roots.** In our own Dental Infirmary at the University of Minnesota, all teeth that show a history of de-vitalization are being X-rayed, but we have not as yet obtained sufficient data to be of statistical value.

I have doubts as to whether our data will ever be sufficient, for the reason that the patients received at the dental infirmary have, as a rule, selected their previous dentists from the pecuniary point of view. It is obviously not fair to judge the type of work done in any given community by such statistics.

The point of this whole discussion is that statistics are a most valuable and indispensable instrument of science. Many truths can be arrived at only by their use. Yet the possibilities and the dangers of the statistical method might not be suspected by the average dentist, unless he has been trained at least in the rudiments of statistical science. It is commonly said that statistics properly juggled can be made to prove anything. What is needed is a knowledge of scientific methods of accumulating data and a passion for interpreting them truthfully; they are not to be used with the idea of proving some preconceived notion. The statistics I have quoted, and others like them, all too frequently circulate solely on the assumed reliability of the author who gives them out; and the average dentist neither has the time nor the inclination, and perhaps not the knowledge to analyze the so-called proofs submitted. I do not mean to question the sincerity of these writers. I do not doubt their good intentions nor their honesty; but it is certainly true that untrained investigators often use their statistics with the sincere conviction that they do actually prove the conclusions reached; whereas a little careful analysis would often show the conclusion to be fallacious.

Much is said in these days of the use of the radiograph in root canal work. While the radiograph is unquestionably an assistance, it must be noted that its value is limited. Some one is sure to arise at this point and say that given a good radiograph the limitation consists only in our ability to interpret. To interpret what? Our ability to recall the anatomy of the roots of the particular tooth! This presupposes an intimate knowledge of the anatomy of the roots of the teeth. What does a picture of Trafalgar Square mean to a man who has never been there? A

square surrounded by buildings with a statue in the centre, but to a man who has lived there the picture is full of meaning.

The surface anatomy of the crowns of the teeth has been minutely described by Doctors Black and Broomell, but the roots of the various teeth have not been so exhaustively treated. It is true that a typical example of the various roots is described, but very little is said of the many variations to be found. What per cent., for example, of the various teeth are true to type? And are the variations sufficiently constant to be classified?

To quote from the editorial: "A number of our most careful and skillful dentists have proven that root canals can be properly treated and properly filled if the proper technique be employed, which includes two and often more radiographs, etc." Have you noticed that when these radiographs are published they always show normal roots? Are we then to infer that only normal teeth can be properly opened up and filled? I fully realize that inclination, skill and patience in the operator will often be a deciding factor; on the other hand, an operation that requires a high degree of skill can only be performed by those possessing such skill. It is implied that what we need is a method of treating pulp canals by the dentist of average ability, that is, some practical standard. Our dental colleges yearn for a similar solution of this same problem. It was with the hope of throwing some light on this subject from which it might be possible to evolve a teachable technique that the Dental College of the University of Minnesota undertook to classify the roots of the molar teeth. In this we were seriously handicapped by the difficulty of obtaining a sufficient number of first and second molars. We have succeeded in obtaining from various sections of the country upwards of 1,500 teeth. These teeth were arranged on long tables. The tables were covered by paper charts marked off by squares somewhat like a checker-board and numbered on two sides. Each chart accommodated 100 teeth, one tooth to a square. The upper first molars were classified first, then the upper second, etc. Mr. Henry, a senior student, has devoted his spare time for two months in classifying and arranging these teeth in groups according to the variation presented. We have only given the work such cursory examination as our duties would permit, and we do not feel, therefore, that the data thus far collected has been sufficiently analyzed and classified to be presented in statistical form. It is given here merely that you may realize that the conclusion reached is more than mere surmise. Judging from the surface anatomy of the roots of the molar teeth, which, being held in the hand, may be viewed from every angle, not possible with a radiograph, which throws a bucco-lingual shadow, we have thus far concluded the following data:

Molar Roots.

The percentage of teeth which may be successfully filled decreases at a very rapid rate as we go toward the distal. I think a little reflection will convince you that this is a logical deduction: the first molar is developed at a time when there is more room, hence its environment is more favorable, so that we would naturally expect it to follow type; the second molar is more likely to be crowded mesio-distally, resulting in a greater percentage of variations in the buccal roots. The third molar shows all the stigma which characterize rudimentary structures. The occasional appearance of a fourth root in the form of a small spur branching from one of the buccal roots, or those roots which present a decided buccal curvature, would show a very mysterious shadow to the dentist whose knowledge of roots was based solely on the radiographs.

I believe that a study such as I have outlined will not only convince the average dentist of the seriousness of the problem, and enable him to interpret rightly the radiographs, but it will make him more loath to devitalize the second and third molar; or appreciating the large percentage of variations which might be expected, the radiograph might be the deciding factor as to whether it would be best to attempt to treat the tooth.

We expect to follow this root classification with a study of the morphology of the root canals, using the technique outlined by Professor Gartano Fasoli, of Milano, Italy. I suspect that fused roots will show the presence of organic matter: canals which may be given off below the pulp chamber, or anastomoses between main branches and the number of apical foramen will frequently be found which could not be detected in a radiograph. It is only fair to state that this latter conclusion is only an opinion, but it is based upon the embryology of tooth development.

In conclusion, permit me to say that I fully realize that I have not solved any of the problems suggested by this timely editorial. But I trust that what I have said will be regarded in the light of constructive criticism.

I cannot close this somewhat lengthy communication without deplored such complications as the story of the pretty young lady with the exposed incisor pulp and the limit of five dollars for that particular tooth suggests. I acknowledge the popularity of the ITEMS OF INTEREST and the necessity of appealing to every type of mind, not only to those who are moved by moderate reflection and scientific trains of argument, but those who need an extreme type, and I yield to no man in my admiration of youth and beauty—and I think I can fully visualize the anguish of this poor but beautiful maiden compelled to part with so essential a factor

from an aesthetic point of view—yet such sentiment does more credit to our hearts than to our heads. What we need is some standard. We may always compromise in extreme cases. But if the short-cut methods of filling root canals lead to malpractice suits, sentiment may be out of place. I earnestly urge a continuance of the discussion, "The Greatest Problem of the Day in Dentistry."

Root Canals Which Cannot be Filled.

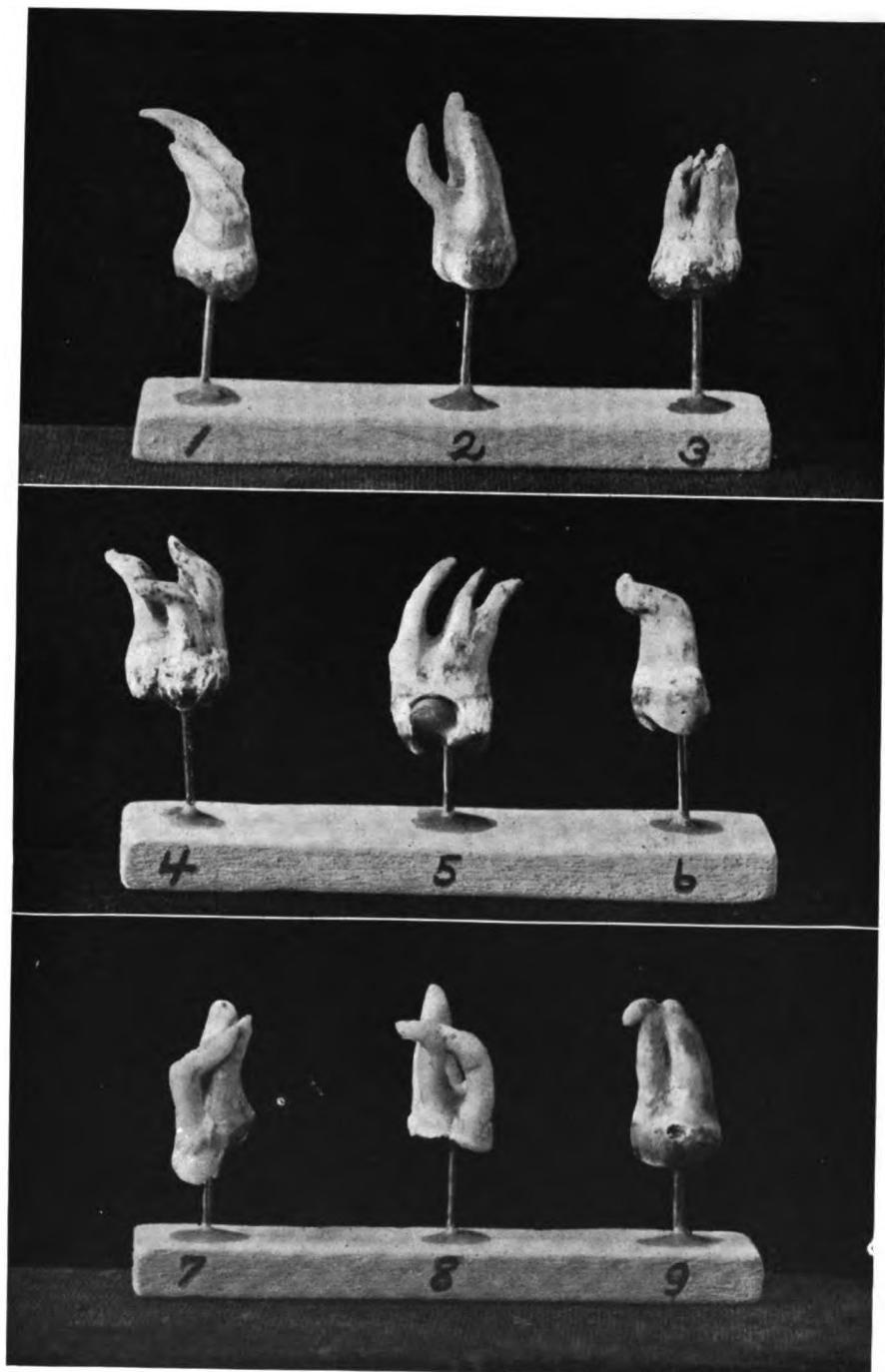
By A. F. PERKINS, D.M.D., St John's, Newfoundland.

I have been following the various articles that have appeared from time to time in ITEMS OF INTEREST and other dental magazines in regard to treating teeth without pulps, and also destroying pulps that are exposed, or nearly so. What interests me more particularly is the constant caution of these writers to "fill the canals to the apex," with the statement that unless they are so filled, failure will follow and a chronic septic condition at the root end will persist that will cause many grave systemic conditions. The last mentioned condition is only too true, for I have had many patients in my practice who recovered vigorous health by the extraction of these teeth with perfectly filled (?) root canals.

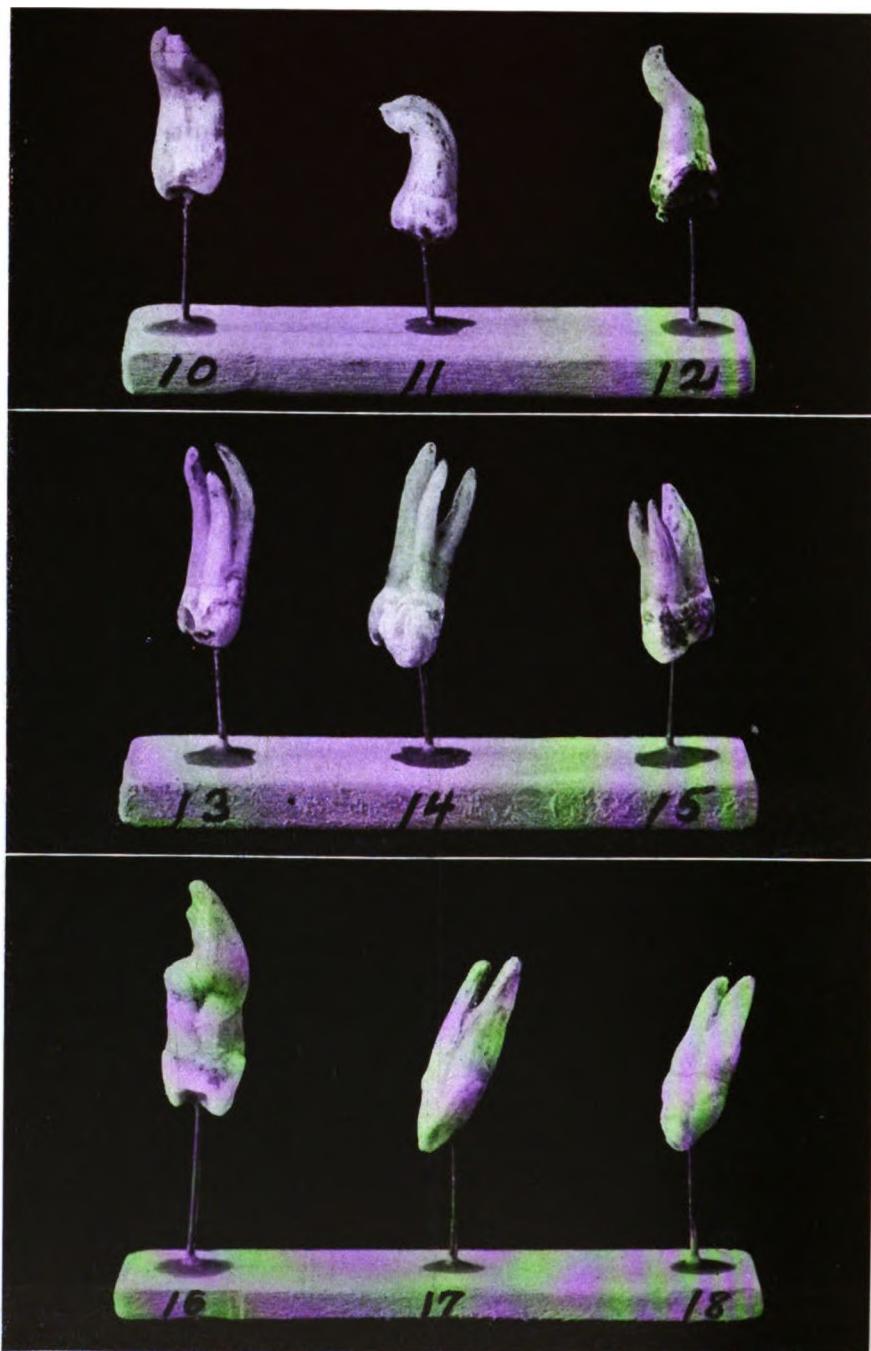
The point that I wish to bring out in this little article is this: Will we not serve our patients better by extracting teeth that become "tender" after careful treating, where to the best of our mechanical skill we have filled as we think to their apical foramen? By "tender" I mean even a little bit tender, if only noticeable at odd times or by tapping with an instrument. I am sure, from past experience and observation, that extraction of these teeth is the only safe means to keep these patients from serious systemic trouble.

I do not believe the man lives who can fill every canal as he ought, no matter how much he boasts that he can. True, he may fill single-rooted teeth now and again, but his great enemy to success is

Dame Nature herself. I am convinced that teeth with malformed and badly twisted roots and anomalies are as common as the normal roots. And once these roots deviate from normal or become twisted, they are beyond the power of any man to fill, or to even remove their contents perfectly. I do not mean that I advocate wholesale extraction, far from it; but I do mean that every tooth which gives *even a little* trouble after careful treatment *should be extracted*. Then if the tooth



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troubles I feel sure that there exists some twisted root or anomaly, and extraction in nine out of ten cases has proven that I was right in so doing.

**Limitation
of Radiography.**

We are told to use the X-ray to verify our work. Yes, but do these pictures show all the details that are necessary; every twist and turn of the root? I think not. Would it have shown that the cuspids in Figs. 17 and 18 had two roots. The picture being taken from the front, the palatal root directly in back would not be shown, but a correct filling for the labial root would be shown, and then we would be at a loss to understand why the tooth was not comfortable. So was I, at first, but not so much so after I had extracted them. *A single canal only* showed after the pulp chamber was opened, and being a single-rooted tooth, as all (?) cuspids are, was all I had reason to expect to find. The illustrations are of teeth (treated teeth) taken at random from a large number that I have kept after extraction, and while unusual, are really not the uncommon run of teeth. In my opinion, irregular and twisted roots are nearly as common as those normally formed. And this leads me to the conclusion that we really fill correctly only about sixty per cent. of all root canals we treat, X-ray experts to the contrary, notwithstanding.

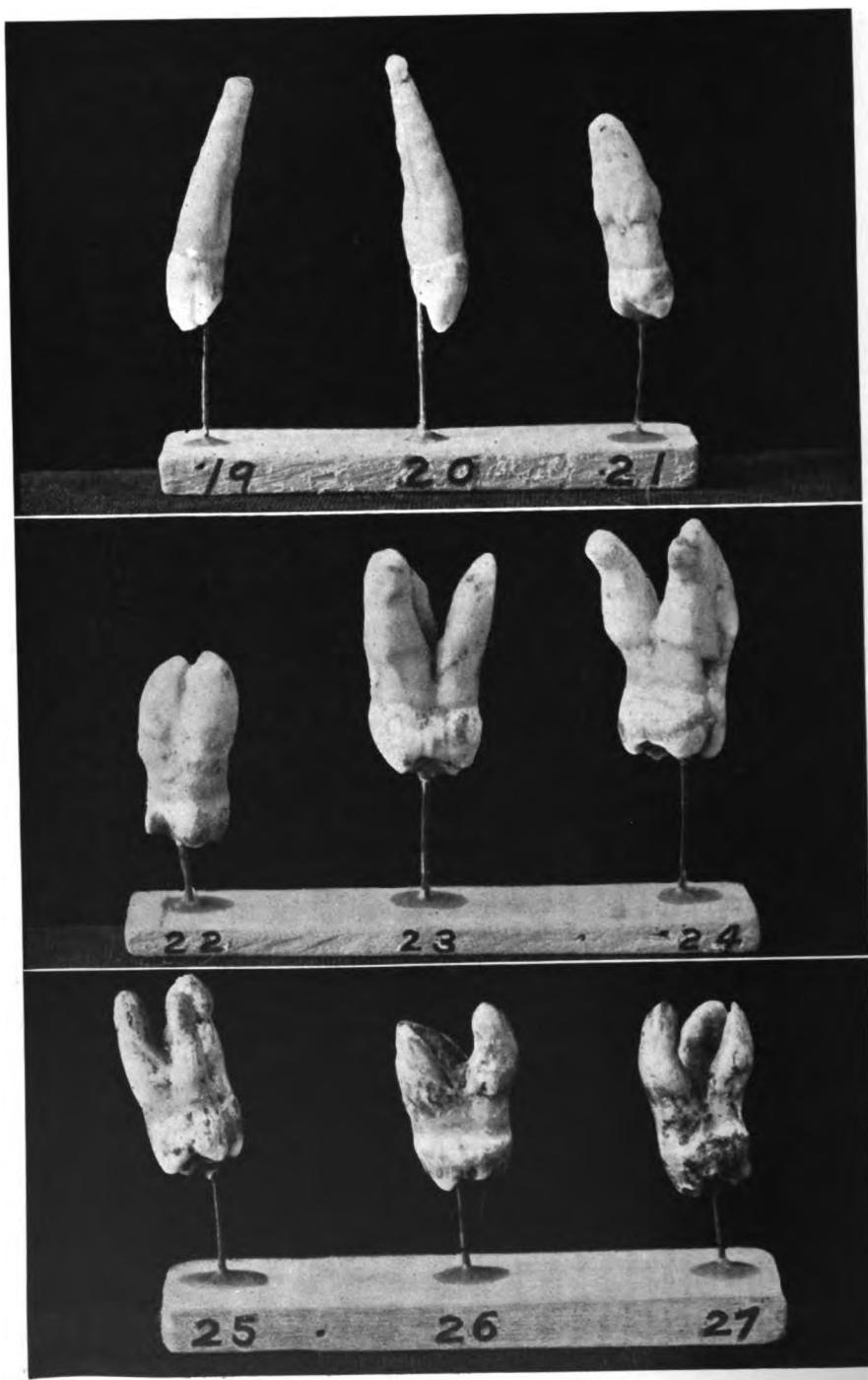
**Explanation
of Illustrations.**

In Fig. 1, an upper second molar, it was an impossibility to extract perfectly the pulp in the palatal root, as you see it takes four distinct turns, and the broach is not made that will take these turns and come away whole. Fig. 2, another second molar, is again a mechanical impossibility, as the canal does not start from the pulp chamber, but branches from the other buccal root, and would be missed entirely by the broach. Fig. 3, a third molar, speaks for itself; impossible of correct filling to the apex of any root. And here let me state that I do not believe in even attempting to treat an upper third molar. If it has reached a point where treatment is indicated, treat it at once—with a pair of forceps. The canals in upper third molars vary from three to five, and always have their root ends slanting backward at nearly right angles. Figs. 4 and 5 are second molars; Fig. 6, a bicuspid; 7, 8, 9, second molars; 10, 11, bicuspids; 12, a central. Figs. 13, 14, 15, are first bicuspids, which I thought might be of interest, as having three distinct roots. Fig. 16, a bicuspid, another twisted impossibility. 17, 18, double-rooted cuspids.

**Cases of
Excentrosis.**

Figs. 19 to 27 are all from the same patient, and might interest your readers. The patient, a young woman, had suffered for a long period from excessive headaches, which were gradually wearing

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her out, and at times almost sent her into convulsions. Her doctor had tried everything to cure her, but she got no relief. Examination of the mouth showed only two teeth with cavities, very tiny, all others being perfectly sound. After a great deal of thinking, I decided to extract all her upper teeth. Every one showed excrementosis, as seen by the illustrations. She made a complete recovery, and has never had further attacks of headache. The cuspids were over $1\frac{1}{2}$ inches long, the longest I have ever seen, and the molars simply enormous. I am only sorry I did not have a scale taken with them so that one could get a better idea of their bulk and size. I used a local anesthetic for this extraction, but had I known that I was to encounter, I would certainly have given a general one.

The Treatment and Filling of "Root Canals Which Cannot be Filled."

By RODRIGUES OTTOLENGU, M.D.S., New York.

Two writers in this issue declare that there are many roots of teeth so distorted, or so anomalous, that the correct filling of their canals might prove a mechanical impossibility.

It is, of course, true that there be canals which cannot be filled. This being true, it is of tremendous importance to determine, were it possible to do so, just what proportion of teeth come within this category. This is important, because if the young practitioner should believe that any large proportion of root canals cannot be filled it would soon become his habit in the presence of difficulties to say to himself: "This is one of those canals that no man can fill."

It is for this reason that articles like those under discussion, however sound they may be, and however true the deductions of the writers, are almost to be deplored because of the mischievous effect which they have upon the minds of men just entering practice by affording apparently scientific excuses for doing less than one's best.

Nevertheless, Dr. Orton's article is published with pleasure, because it is an appeal for more accurate statements by men dealing with this and allied subjects. Dr. Perkins's communication is particularly welcome because of his fine illustrations which afford us graphic pictures of teeth which he considers unfillable, and thus makes it possible to discuss the debatable question, "What is an unfillable canal?"

**What Proportion
of Canals are
Unfillable?**

Dr. Perkins does not believe that the man lives who can fill every canal as it should be filled. This, of course, is true. It is likewise true that because the proportion of unfillable canals is declared by men of repute to be higher than it really is, many practitioners fail to fill canals which they should be competent to fill accurately. The appeal therefore is not for the impossible, but that the possible should be attained more frequently.



Fig. 1.



Fig. 2.

**Single Rooted
Teeth Often
Unfilled.**

Dr. Perkins says that men "may fill single-rooted teeth correctly now and again." It seems to be commonly believed by the majority of dentists that they can fill canals in single-rooted teeth without trouble and without the aid of the X-rays; that it is only the multi-rooted teeth that are difficult, and that at least one root of all molars is easy. Yet it can be proven by the records of any radiographer that single-rooted teeth in a large proportion of cases examined are imperfectly filled, and that in molars, when the finer canals are found unfilled, the larger canal is usually but partially filled also. If this statement is seriously doubted, the writer will undertake to obtain proof of it from a dozen radiographers.

The moral (or immoral?) of this is that the present handling of root canals by the majority of dentists is wofully inefficient, this inefficiency being only to a slight degree dependent upon contortions, constrictions and anomalies.

It may be true, as Dr. Perkins says, that "we really fill correctly only about sixty per cent. of all the root canals which we treat." But if true, it is a disgrace to American dentistry that it should be true,

because no such proportion of cases is unfillable. But how does Dr. Perkins arrive at this proportion? Dr. Orton truly says: "General accusations such as these should not receive serious consideration, unless writers accompany their statements with full particulars of how their statistics were obtained and how interpreted." Speaking of the claim that root canals can be filled if the proper technique be used, aided by radiographs, Dr. Orton says: "Have you noticed that when these radiographs are published they always show normal roots?" And Dr. Perkins presents us with an exhibit of photographs of twenty-seven teeth, the abnormalities of which he thinks would preclude the possibility of correct root canal fillings.

**The Filling of
Canals in
Abnormal Teeth.**

In response the writer begs leave to present radiographs of roots which were not normal and which nevertheless were satisfactorily filled. This is done, not with any disputatious intent, but rather in the hope of contributing a little evidence which may aid us in determining what is and what is not possible in the management of anomalous conditions. Moreover, the writer has no doubt that more skilled operators might even further lessen the field of the supposedly impossible by reporting cases.

As evidence of the previously made statement that failures in root canal fillings are not restricted to multi-rooted teeth I introduce Fig. 1. Here we see two crowns and a gold filling in three adjacent single-rooted teeth, not one of which shows a correctly filled root canal. Moreover, all three roots are abnormal. The cuspid root is abnormally long and fairly well matches Nos. 19 and 20 of the Perkins exhibit. The first bicuspid has a curved root and the second bicuspid has a root abnormally short with a canal completely obliterated by deposition of secondary dentine. Fig. 2 shows all three root canals filled to the apices, or one might say at their apices, as the radiograph was taken prior to the completion of the root fillings, a precaution which I recommend in difficult or doubtful cases, as it is manifestly better to learn that the apex has not been reached, should such be the case, prior to packing the canal full of gutta percha.

Nos. 17 and 18 (Perkins exhibit) are double-rooted cuspids, and Dr. Perkins tells us that the radiograph would not have disclosed this fact, a correct root filling in the labial canal hiding the unsuspected lingual canal. But we should always suspect a cuspid of having two canals, and the radiograph should always be taken so that the two canals, if present, would be seen. I have found and I have filled double-rooted cuspids, but have no radiograph of such a case good enough for reproduction. Fig. 3, however, will cover this point quite well. Here we see a double-rooted

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Fig. 8.



Fig. 4.



Fig. 5.

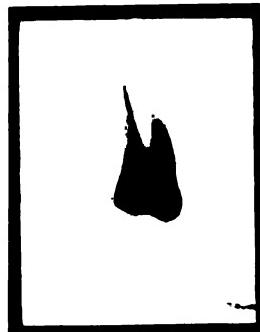


Fig. 6.

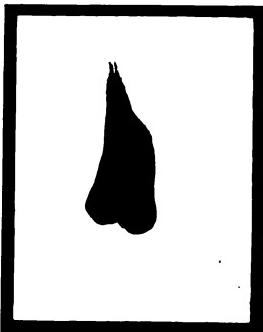


Fig. 7.

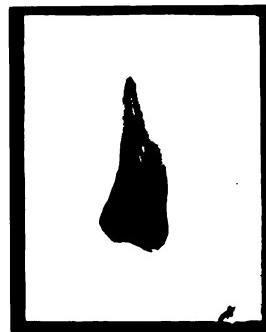


Fig. 8.

bicuspid with wires in both canals clearly visible, and Fig. 4 shows both of these canals filled. In passing, attention is called to the root filling in the cuspid, the root of which is curved at the end. Considerable chloro-percha has passed through the apex, yet the root has remained uninfected, though it was filled ten years ago. Still I freely admit that I prefer such apical sealing as appears in the bicuspid.

Dr. Perkins's No. 1 shows a tooth of which he says that the broach is not made which would follow the curves of the canal and come away whole. Of course, I cannot speak of this identical tooth, though I should be glad to have it for a test case. However, Fig. 5 shows a tooth very like it. This was sent to me a year ago with this terse note: "When you have the time and inclination, please fill the canals of this one." Following routine, a radiograph was taken first. It is shown in Fig. 6, and here we see that the dentist who treated this tooth prior to extraction left parts of broaches in both canals. There were but two. This accords with Dr. Perkins's declaration regarding this type of tooth, and perhaps he will admit that this case, with both canals obstructed with steel, presented quite as difficult a problem as his No. 1. Fig. 7 shows this tooth with broken broaches removed, and wires passing to the apices of the canals. Fig. 8 shows the canals adequately filled in spite of the curvature and extreme fineness of one of them. The broaches were removed after repeated applications of the Callahan method of using sulfuric acid and soda. The time required would perhaps have been prohibitive in the mouth, but surely we have proven that a correct technic used in the first instance, and carried out without the breaking of instruments, might have resulted in the correct filling of this tooth, which a man of national reputation declared to be an example of the impossible in root canal work.

Let us consider numbers 6, 10, 11 and 12. No. 6 is impossible, and perhaps, note that I say perhaps, No. 11. Yet both could be saved by filling the canal as far as possible and amputating the unfilled portion.

Nos. 10 and 12 are difficult, but within the realm of the possible. Let me present a similar case.

Fig. 9 shows a first bicuspid, with curved root and broken broach in canal. Fig. 10 shows both canals cleansed of débris with sodium and potassium, and wires introduced. The radiograph shows the wire in one canal resting against the broken broach, while the wire in the other canal passes beyond the other end of the broken broach, indicating that the two canals terminate at the same apical foramen. This knowledge made it possible deliberately to bur away the broken broach, and Fig. 11 shows the condition after removal of the broken broach. Here also we see a wire passing through the apex and note that the cutting away has per-

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Fig. 9.



Fig. 10.

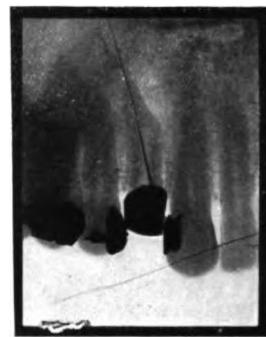


Fig. 11.



Fig. 12.



Fig. 13.



Fig. 14.



Fig. 15.



Fig. 16.



Fig. 17.

mitted this wire to pass in a straight line. Fig. 12 shows this root filled.

Nos. 13, 14 and 15 are bicuspids having three roots. I have never treated one in the mouth, though I am constantly on the watch for such a condition, as I have seen bicuspids which have even as many as four canals. Beyond the fact that the operator might overlook a third canal (which he should not do), a three-rooted bicuspid offers no greater difficulties than a molar of similar form. To match Nos. 13, 14 and 15,



Fig. 18.

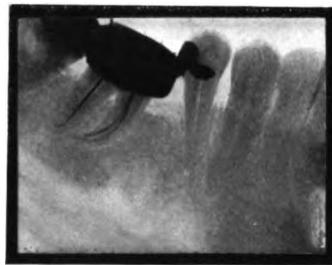


Fig. 19.

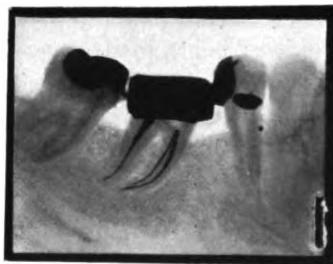


Fig. 20.

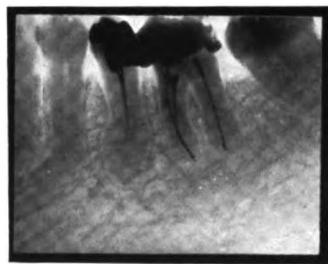


Fig. 21.

therefore, I present Fig. 13, a particularly long-rooted upper molar of quite similar shape.

As a mate to No. 2, I present a similar upper molar. Fig. 14 shows this molar with mesio-buccal root badly curved and the disto-buccal root masking the palatal. Fig. 15 is the same with wires to ends of all three roots. Fig. 16 shows the canals filled, but as the palatal root is masked, a radiograph was taken at a different angle, and in Fig. 17 we see that all three canals are filled.

We have now to consider roots of the type seen in Nos. 4, 7 and 8, where the curvature is very great. It is possible that these particular teeth might have proven too difficult, but let me show one which I undertook with great hesitation. Fig. 18 is from a lower molar with badly

curved roots, the curvature, however, being more distinctly seen in Fig. 19, where the wires are in place. Fig. 20 shows these root canals filled.

Dr. Perkins tells us that No. 3, "a third molar, speaks for itself; impossible of correct filling to the apex of any root." Perhaps. Yet if I needed that tooth for a bridge abutment I should not hesitate to undertake the root filling, and moreover, I should expect to succeed.

Of No. 16 I must say that I could express no opinion without a radiograph. Despite its contorted external appearance the canals may be easy.

We have left Nos. 19 to 27, all from the same patient, and all examples of excrementosis. These teeth, according to the history, were removed, not because of the impossibility of filling the canals, since no attempt in that direction is recorded.

In these cases there seems to be authority for stating that two conditions may maintain. First, the excrementosis may exist without obliteration of the foramen. Secondly, the new growth of cementum may completely cover the foramen, rendering the canal impervious at the apical end.

In Fig. 21 we see both conditions. In the second lower bicuspid we observe a root filling which does not reach the end. Radiographs satisfied me that the canal was impervious beyond this point, and as the alveolar bone appeared healthy, no attempt was made to penetrate further. Had an abscess been present I should unhesitatingly have drilled through the end, creating a foramen artificially for the purpose of drainage and treatment. In the adjacent molar, treated some years later, because of the death of the pulp and abscess, the foramina were found present. The canals were cleansed and wires passed to their foramina and the canal filled. (Fig. 21.)

In conclusion, I have only to repeat that this is merely an appeal against the too ready decision that a given canal cannot possibly be filled. The more canals men try to fill, the more canals will men fill.



A New Method of Attachment for the Loop Arch.

By RAY D. ROBINSON, D.D.S., Los Angeles.

Read before the American Society of Orthodontists, Toronto, Canada, July 2, 1914.

From the time of the use of the metallic arch by Fauchard down to the present, a variety of methods have been utilized to secure attachment of individual teeth to the arch, and for the application of force for various purposes. The original arch of Fauchard was merely a form to which the teeth were brought by the immediate force applied with forceps, or by the gradual shrinkage of the various kinds of contractile ligatures, such as cotton and silk thread. Then came the elastic metal arch by Patrick, Farrar and Angle. The anchorage bands were also largely the result of the work of Angle, Lukens, Barnes, Kemple and others.

A variety of tooth movements by various methods and authors is also of historic interest and might be of value to consider had we here the time to discuss them in their various relations.

The screw force as developed by Farrar, the elastic arch of Patrick, the steel tempered wire fingers and loops by Jackson, the elastic rubber bands of Case and Baker are well-known methods which have in their various times and several ways done much to make modern orthodontia a scientific art.

The author's experience with the Angle arch, with its system of wire ligatures, has frequently caused him and his patients so much worry and anxiety that he longed for a simpler and less troublesome method of applying the arch, and also for the development of a force which while constant would be under such complete control that it would be more easily tolerated by patients.

More recently the so-called Angle attachment of tube and pin with the three-piece arch was a decided advance over the former one-piece arch with ligature attachments, but its construction and adaptation require such exact adjustment that but few men have the technical skill to apply it to the best advantage for securing desired alignment of the teeth, and it leaves much to be desired in those cases where great expansion is needed. This latter objection, however, in large measure, should be overcome by the looped arch suggested by Dr. J. Lowe Young. I have, however, to confess that I have not seen Dr. Young's adaptation nor have I any personal acquaintance with his particular invention.

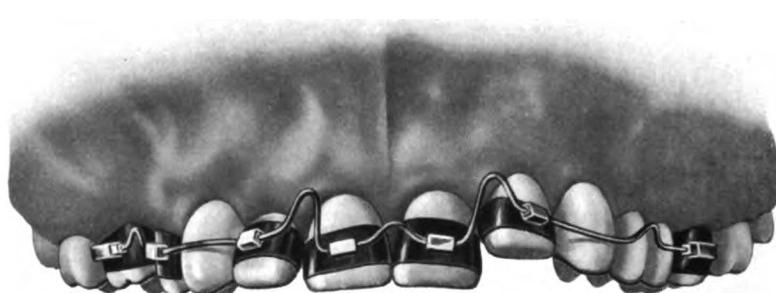


Fig. 1.

The appliance which I have to present for your consideration is a loop arch attached to the teeth by a series of definitely formed angular blocks, soldered to the arch and resting securely but not immovably in corresponding seats which are soldered to the bands on the teeth.

The idea in designing this appliance has been to secure all the needed tooth movements by a single appliance that is easily adjusted and that will not require frequent inspection nor continued surveillance, exerting at all times a delicate and positive force rather than inducing a severe force intermittently applied.

The following description of the apparatus is abstracted from an article contributed to the June, 1914, ITEMS OF INTEREST:

"The appliance consists of a delicate spring arch (Fig. 1), bent to conform to the individual dental arch to which it is to be applied, with loops extending toward the root or toward the occlusal end, as may be found convenient, placed in advantageous position; and an attachment consisting of a seat (Fig. 2) soldered to a plain band on the tooth and a square hollow block of metal, the outside measurement of which is the same as the inside of the seat, and the bore of which is equal to the diameter of the arch wire (Fig. 3)."

"The seat has a flat base and parallel walls extending at right angles to the base, the walls being fifty per cent. higher than the width of the base, which allows sufficient material to bend over the fourth side of the block, thus enclosing it in a square tube which it accurately fits (Fig. 4)."

"In constructing and applying this apparatus, the bands with seats attached are first made and cemented to the teeth, using a form of anchor band."

At this point I wish to deviate from the published article and describe a form of anchor band devised since the article from which I have been quoting was written. This anchor band is a modification of the



Fig. 2.



Fig. 3.



Fig. 4.

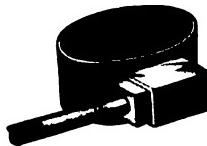


Fig. 5.

Lukens' band. The modification consists of making the tube post with a square socket extending approximately one-half its length from the screw end, leaving the square end of solid metal; and a locking device which will lock the post on any quarter turn. The locking device consists of two holes drilled at right angles with each other through the solid portion of the tube post in a position which will bring them under the metal collar on the band and two holes drilled through the collar in alignment with each other in such a position that they will come opposite the holes drilled through the post. This permits the tube posts to be locked by a delicate pin on any quarter turn, thus assuring an absolutely rigid attachment to the anchor tooth, and also assuring a bodily movement of the anchor tooth if it is desired. This form of anchor band, having been placed on the anchor teeth, I will now return and read from the article published.

"The requisite number of blocks being placed loosely on the arch wire, a long block (Fig. 5) is soldered to one end of the arch, which is then

put into place in the square socket in the anchor band and the arch bent in such a way as to bring it into the adjacent seat, a loop being formed if desired. One of the blocks is now brought to the proper place on the arch wire to engage in the seat. The arch is then taken from the mouth and the block soldered. The arch is again placed in the mouth and again bent to bring it into alignment with the next seat, it being understood that loops are formed between such seats as is deemed necessary for the development of force and for the directing of the movement of the teeth. This operation is continued until all the teeth requiring movement have been engaged, when another long block is soldered to the other end of the arch to engage in the other anchor band.

"After polishing, the arch is next put into place and the extensions of the walls of the seats are bent over the four sides of the blocks (Fig. 4).

"It will be readily seen that the attachment between the arch and the tooth is absolutely rigid, and any movement of the arch wire will in time be registered in the tooth.

"In that form of appliance, having tubes soldered to the bands parallel to the long axes of the teeth and posts soldered at right angles to the arch to engage in these tubes, such absolute accuracy of adjustment in soldering is necessary as to make the appliance efficient only in the hands of the skillful technician. It must also be appreciated that as the planes of the post and arch are at right angles to each other, any inaccuracy in alignment will be magnified in the tooth movement, whereas with this appliance and its accurately fitting blocks, inaccuracy in construction and adjustment are practically impossible. The long axes of the arch wire and the block, which is to be soldered to it, not only lie in the same plane, but the arch wire actually passes through the centre of the block, eliminating all possibility of error in alignment.

"As the block can both rotate and slide on the arch wire, it is easy to place it in the exact position required by forcing it into the seat. Once it is in its proper place, it is pinched slightly with pliers to prevent its becoming misplaced while being carried to the flame for soldering. Thus it will be seen that it will require the grossest carelessness to make an error in transverse alignment.

"There should be no trouble in bending the arch wire into the desired form. The wire commonly used is 24-gauge B. & S., and very frequently 26-gauge wire will be sufficiently heavy. As the first block is soldered before any bending is necessary, and as it holds one end of the wire rigidly in its proper position, and as the bending can be done in the mouth, the writer can see no reason for either error or difficulty in bending the arch, even by those of average ability.

Tooth Movement.

"A little study of this appliance should convince the most skeptical of its efficiency. It will be seen that by springing a loop open, force will be brought to bear on the teeth adjacent to that loop. As, for instance, opening the loop in the incisor region will exert force in the direction necessary to widen the arch as far as the cuspids. If it be found necessary to carry the incisors labially, the loops in the cuspid, bicuspid and molar regions will be sprung open. If it be found necessary to carry the incisors on one side mesially, and those on the other side distally, without carrying them labially, as frequently happens, through the premature loss of one of the deciduous cuspids, it can readily be done by opening a loop placed over the cuspid region where the space is to be made and closing one over the opposite cuspid region. If found necessary to widen the arch in the bicuspid and molar region without widening the incisor and cuspid region, it can be accomplished by slightly opening the seats on the incisors, allowing the blocks to slide distally through the seats and then opening the loops in the incisor region. It will be readily seen that the force generated by opening these loops will be exerted in the desired direction and place.

"If a movement tending to throw the apex of the root buccally or labially is desired, it can be secured either by bending the adjacent loops in the desired direction or by taking the arch from the mouth, heating the block, and while hot turning it in the desired direction. When again placed in the mouth, it will be found necessary to spring this block to place. When the edges of the seat have again been bent over the block, it will exert force that will cause the apex to move in the desired direction. If it be found necessary to move the apex mesially or distally without disturbing the relative position of the crown, it can be accomplished by bending the adjacent loops in the directions indicated. It will readily be seen that more than one of these movements can be accomplished at the same time. In fact, any desired movement of the teeth can be accomplished without disturbing other teeth which may be in their proper places. The reasons for this are: That the attachment between the tooth and arch wire is absolutely rigid, and second, the force necessary to the tooth movement is generated at the point where it is to be applied.

"The force being that of a spring and generated from small, delicate wire loops is not violent in its action, but slow and delicate, although none the less positive. Being of this character, the result resembles a physiologic rather than a pathologic action, causing the minimum of pain and requiring a shorter period of retention.

"The force is more directly applied, is longer continued, is more

easily controlled and causes less annoyance than that generated by any other appliance with which the writer has had experience.

"It is obvious that a triangular block, or any angular or oval or round block, with a pin raised on one side, placed in appropriate shaped seats, would accomplish the same results. It is also obvious that the converse of this is true, that is, the same result would be accomplished by placing the seat on the arch wire and the block on the band.

"The attachments could readily be used on the old form of arch, depending on screw force, but the writer finds the force generated by opening the loops to be of such a character as to produce better results with less annoyance."

Since writing the article from which I have just been quoting, I have found a different form of block to be easier to handle than the square one. This form consists of a flat base and parallel walls extending at right angles to the base for about half their length and then converging to a point opposite the centre of the base. This form gives absolute rigidity and requires that the seats walls shall be bent at a less acute angle, making the appliance easier to handle on account of the ease with which the seats may be repeatedly opened and closed and assuring a longer life to the seat.

Realizing that on first inspection of this appliance your principle objection would be that the seats are liable to fracture under repeated opening and closing, I will show three forms of seats that will lock the block securely into place without the bending of any metal. Each of these forms is efficient, but the writer has experienced so little difficulty through breaking of the seats, and he finds that locking the block by bending the seat walls is so much simpler that he prefers this method to any other.

The advantages of this appliance as they have appeared during the more than two years of its development into its present form may be summarized as follows:

Advantages of the Method. First: A more perfect control of tooth movements. All the different tooth movements are easily and comfortably accomplished with definiteness and saving of time for all ages and patients that are amenable to treat with any other appliance.

Second: Freedom from ligature troubles. Because of the design there can never be irritated or diseased gums, cheeks, lips or tongue from obtrusive projections, and every facility for cleanliness is secured. All attachments in the form of bands are accurately fitted and cemented to the teeth, so that no part of the metallic appliance comes in actual contact

with the tooth tissues, thus precluding the possibility of erosion of the teeth even though the treatment be unusually prolonged. The arch can be so formed and adapted that at all times it should lie close to the teeth, obviating serious objections to many forms of appliances formerly used.

Third: Facility for changing form and making repairs. The seats may be readily opened and the arch released when occasion requires such a procedure. In fact, the entire arch can be removed for soldering into place a new block or to change the position of a block, or to repair a



Fig. 6.



Fig. 8.

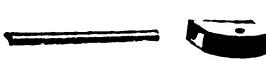


Fig. 7.



Fig. 9.

broken seat or band. The seats are capable of being opened and closed many times without impairing the integrity of the metal. Thus it will be seen that the appliance is amenable to such repairs as are customary with all other appliances, and with equal facility.

Fourth: Retention. Teeth moved with this appliance are less difficult to retain because the movements are less violent than with some appliances. Under this treatment absorption and tissue rebuilding take place in a more nearly physiologic manner because of the nature of the force applied. However far such a tooth may be moved, it is at all times supported and protected from shocks that would retard new tissue development. Consequently, when the movement is concluded the retention period should be much shorter than when the teeth are moved by the intermittent forces. In fact, the writer finds that the moving appliance makes an excellent retention appliance. This is accomplished by opening all the seats when the movement is concluded, and the loosened arch is so bent that each block will be dropped back into its correspond-

ing seat and lie passive; the seats are then closed and the teeth remain at rest.

During the development of the appliance, the writer first used a square wire for the arch; he then tried a triangular wire and afterwards a flat wire, with appropriately shaped seats and locking device for each form of wire. These forms proved about equally efficient, but all had

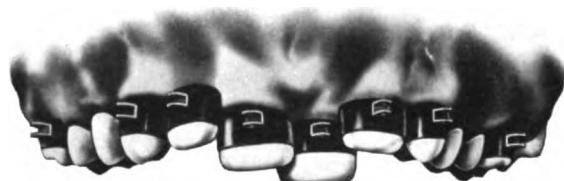


Fig. 10.



Fig. 11.

the common fault of producing a completed arch of unequal expansive force when loops were put into the wire, owing to the sharp angles produced when the arch was bent. This was due to the fact that equal resistance is not obtained when, for instance, a flat wire is bent in the direction of one of its flat sides one time and in the direction of the edge the next time. Still greater uncertainty is encountered in bending a square wire in any angle between the flat side and the corner. In using these angular wire arches it was not necessary to solder blocks to the arch, as the arch wire could at any place be locked securely into the seat. The advantage of being able to put in loops at any angle without producing unequal elasticity so far outweighs the small disadvantage of soldering the blocks onto the round wire that there is now no question in the writer's mind as to the superior merits of the round wire for the arches.

Another advantage of the appliance is that when it is once adjusted with bands cemented and the arch locked into place in the seats, it is so firmly fixed that the patient has no power to disturb it or to interfere with

its operation. It can be so delicately adjusted that the patient has no desire after a few days to interfere with it in any way.

What the writer believes he has a right to claim is originality in discovering a form of attachment which effectively supplants all former wire and ligature methods with a more easily adjustable and more secure attachment, which he also believes has distinct advantages over the tube and post attachments.

If a delicate but positive force under perfect control, which can be applied over a long period of time without attention, is desirable, the loop arch will give it. If a rigid attachment that will insure absolute bodily control of the tooth, and one that can be applied or released at will quickly is desirable, then the seat and block attachments meet these requirements.

Since preparing this paper, some sixteen months

October 1, 1915. ago, the writer has modified the form of lock as illustrated in Figs. 6-9. The seat (Fig. 6) consists of a flat oblong base and two flat parallel walls rising at right angles to the base. The walls are rounded at the top and each is pierced near the top with a small hole, the two holes being in alignment. The seat is made of platinum-gold and is .022" thick. The distance between the walls or across the base of the seat is .040".

The block (Fig. 7) is of platinum-gold, but harder than the seat, and is .040" thick and shaped to fit inside the walls of the seat above described, except that it is .005" greater in elevation than the side walls of the seat, which provides means for its being forced into the seat with a pair of pliers, when there is stress on the arch wire to which it is soldered. The block (Fig. 7) is pierced by two holes; the larger runs longitudinally and its bore is equal to the diameter of the arch wire used, or .020". The smaller hole is through the transverse diameter of the block near the top and is in the exact place to be brought into alignment with the two holes in the seat walls when the block is forced into place in the seat. The block is locked into the seat by placing a delicate pin through the seat walls and the block (Fig. 8). When so locked, no play is possible. The two parts are made to fit to the minutest fraction of an inch, and as they have three flat walls in apposition, and are tightly locked together, they do not permit of any play whatever. The molar and anterior attachments are alike, except that the molars are the longer (Fig. 9).

Fig. 10 illustrates a case in which all the bands, with seats attached, have been cemented into place ready for the arch.

Fig. 11 illustrates the same case after the arch, with the blocks attached, have been locked into place.

This form of lock has overcome any liability the older form may have had to work loose under stress of mastication.

Discussion of Dr. Robinson's Paper.

Dr. Waldron. I cannot say very much for or against this type of appliance as recommended by Dr. Robinson, because I have not been using it for more than seven or eight weeks, but I am, however, trying it out on two cases. I cannot agree with Dr. Robinson that it is so simple in its construction, but possibly familiarity will overcome this difficulty.

In making the bands for the incisors I should recommend that they be carried under the gingival margin on the labial surface of the teeth, as advised by Dr. Young in his description of banding teeth for the new Angle appliance. This would lessen the susceptibility of caries, inasmuch as the tooth would be protected from the influence of putrefactive matter which would lay from time to time between the loops in the expansion arch and the teeth.

As far as the efficient control of this appliance, I am not in a position to state with my short experience with it, but I think the operator would have to familiarize himself with the dynamics of this arch, for bending the loop in one direction will exert an equal force in the opposite direction. Therefore, you must have your resistance always greater than the force to be moved, and to do this, as I have stated before, requires a greater knowledge of the dynamics of this arch than I possess at present. I have been amazed at the amount of expansion accomplished by this delicate appliance, and also that there has been no sign of tenderness since the appliance was put on.

The base wire which I used was twenty-four gauge, of gold and platinum, and to anneal this I place the wire on a copper pan, which is heated over a Bunsen burner to a red heat and then immediately I plunge the pan and its contents into cold water. This thoroughly anneals the base wire so the loops can be bent without fear of breaking.

It would be useless for me to discuss the technique of constructing this appliance, but I should prefer a semi-elliptical block and block seat to the square, or the five-sided block and seat as used by Dr. Robinson, because a square block would require bending the block seat to an angle of 90 degrees, and the constant opening and closing of the seat would soon result in breaking of the same, whereas the semi-elliptical block seat would not require bending at so acute an angle, hence the liability of breaking is much lessened.

In explanation of the fact that Dr. Waldron saw these bands so low down, it is only fair to say that he saw them on the plaster model sent to me from which an illustration was made. I do not think it possible with a plaster cast to make bands that would go up any higher than these were.

No doubt Dr. Robinson carries them nearer to the gum margin in practice.

Dr. Hawley. I would like to know whether Dr. Robinson is planning to furnish these parts to the members, or how we may obtain them.

Dr. Grieves. I have had no experience with these extremely light wires. The work I did for you some years ago was done with the Angle appliance and with gauges number 16 and 20 wire. I had the Bureau of Tests in Washington take that work up for me, so that all alloys entering into arch construction might be tested for resilience and elasticity, and the results were most confusing, particularly when heat was applied. These results varied in the German silver alloys proportionate to weight, gauge and consistency, so I reached the conclusion that alloys are very variable things, particularly the elasticity of the alloy as changed by annealing, which varied greatly when heated. A definite formula for the arch, annealed always under like conditions, in my humble opinion is the only way we will exert a definite force and get practical results such as Dr. Robinson claims. If the patient is not examined for a month or more, that seems like a long time to allow this force to act, and I fear it will vary greatly in different parts or buckles of the arch unless the wire is annealed with the greatest care.

Dr. Ottolenghi. In reply to what Dr. Grieves has just said, I will say that Dr. Young has devised an annealer to cover exactly that point. He not only anneals the wire before he puts it into the mouth, but it is annealed again after soldering the parts added by being put in an electric heater, and it is controlled by a rheostat. Dr. Young claims that he gets uniform tension.

Dr. Grieves. Then his alloy must be the same in all instances.

Dr. Federspiel. How do you open the seat?

Dr. Robinson. With a small excavator spring up the extension wall of the seat.

A Member. What is the arch wire made of?

Dr. Robinson. The seat is made of iridio-platinum. The arch is made of .020" platinum-gold.

Dr. Federspiel. How do you move the apices of the teeth forward?

Dr. Robinson. The blocks are turned in the direction indicated so as to spring the wire and then forced back into position.

Dr. Monroe. Does not that exert pressure upon the back part of the arch?



Items of Interest

Dr. Robinson.

Certainly. There is no action without an equal and opposite reaction.

A Member.

Is it possible to make many movements without moving the arch?

Dr. Robinson.

Practically all the movements can be accomplished without moving the arch from the seats. The elongation or spreading can be accomplished

without unlocking a single block. Where it is necessary to put tension on a tooth, it is essential to unlock and change the position of the particular block intended for that tooth.

Dr. Hawley.

How long does it take and how often do you have to see the patient?

Dr. Robinson.

I see my patients only once a month.

Dr. Hawley.

I meant relative to the action of other appliances.

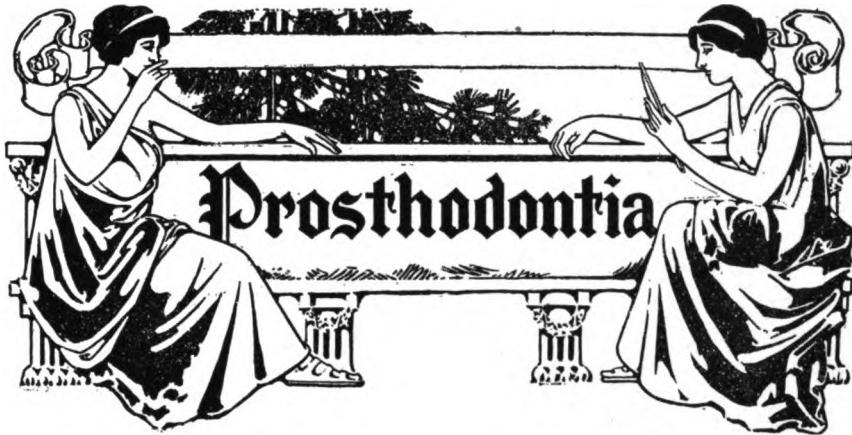
Dr. Robinson.

You can use the Angle appliance and widen the arch more quickly than with this, but this will require a shorter period of retention. I have a case that was passing into the third month since any pressure was applied, and the teeth are still moving. The contention is that while the pressure is more delicate than it is with a bigger form of arch and screw force, it is constantly applied over a much larger period.

I want to say this regarding the loops between the seats, that it makes no difference if the appliance itself does get out of shape, because when it is put back into the mouth the blocks are forced back into the seats again, and if they do not lie there passively the loop is bent until they do lie passively. The appliance is absolutely passive when put into the mouth. It has no tension in any direction.

I have taken out a patent on this appliance for the protection of the profession, not to make money out of it in any way, and in order to be sure that the profession will be protected in this if this association will take over these patents I would be glad to present them to the association, so that you may have the appliances manufactured properly, and if there is any profit it can go into the treasury of the association for a special purpose or any purpose you may desire.

There is just one thing in connection with what Dr. Waldron has said that I wish to speak of. The parts were beautifully made by a machine designed by a man from my city. He can make the appliance as it should be made, and if the association accepts these patents, I would like to see that this man gets a legitimate manufacturer's profit, because he has put in a great deal of work and ingenuity in making it.



The Principles, Functions and Construction of Saddles in Bridgework.

By HERMAN E. S. CHAYES, D.D.S., New York.

The saddle is that part of a bridge which rests upon the mucosa and supports the artificial tooth or teeth.

The greater the area covered by the saddle, the more stable will be the support of the bridge under the stress of mastication.

The size and design of saddles must vary as the kind and number of artificial teeth supplied and as the condition of the underlying tissue.

Single anterior teeth may be supplied with a saddle no larger than the gingival circumference of the teeth themselves, provided that the artificial tooth is attached to parallel natural abutments by means of parallel attachments at its mesial and distal extremity.

The saddle as a means of relieving the stress upon abutments is a far more important factor in upper posterior bridges than in lower ones, because the mandible is the moving member of the masticating machine—or its power arm.

The ultimate shape of a saddle must be calculated not to encroach upon the gingival circumference of the teeth adjacent to the edentulous space.

A saddle should not be movable upon the mucous membrane, but should move with it. It may be correctly compared to a pontoon bridge moving with the tidal motion of the liquid upon which it rests.

The area of a saddle should equal the area of the roots of those teeth which are being replaced with the artificial ones carried on the saddle.

A saddle must be so shaped buccally and lingually that it will not encroach upon any of the muscles while at rest or in function.

A saddle must be perfectly adapted to the subjacent tissue.

A properly cast saddle is more perfectly adapted to the subjacent tissue than one which is swedged.

The same amount of care, skill, labor and attention to detail will yield a better saddle by the casting process than by the swedging process.

The displacement of tissue which occurs beneath a saddle when in function can be well taken care of by the provision of a chamber on the palatal or linguo-mandibular side of the saddle. The size and shape of this chamber should vary in proportion to the area of tissue upon which the saddle rests and with which it moves when the teeth it carries or supports are in function.

The saddle should be as thin as the stress to which it will be subjected will permit, and it should never be of a bulk which would prove obtrusive to any of the surrounding and adjacent or subjacent tissues.

**Physiological
Functions of
a Saddle.**

The muscles of mastication are the motor, the artificial teeth, resting upon the saddle, are the driving or vibrating shaft, and the saddle is the applicator which massages the subjacent mucosa and underlying structures when the artificial teeth are in function.

The more perfect the occlusion of the artificial teeth, the more rhythmic the periodicity of the intermittent pressure transmitted through the saddle intermediary to the subjacent tissues.

The more rhythmic the periodicity of the intermittent pressure, the more rhythmic the waves of vibration engendered by the intermittent pressure and transmitted through the saddle intermediary to the saddle applicator, thence to the adjacent and subjacent living tissue, and the more perfect will be the vaso-motor action of the nutrient vessels of these tissues.

All the foregoing is in harmony with the statement that a bridge is an artificial partial denture resting upon a floating base, its motion being aided to a degree limited by parallel attachments constructed in accordance with the geometric conception of the arc being tangent to a straight line.

Again teeth, natural teeth, our own teeth move in the exercise of their function; they move in various directions, the degree and direction



varying as the complexity of function, being little and more or less simple for incisors and intense and multi-directional for trituration.

A saddle which is imperfectly adapted to the underlying mucosa, and which cannot move while the teeth are in function, will always cause resorption.

**Evils of
Improperly
Constructed Saddles.**

A saddle which snaps into position by means of some clasp or clamp attached to it, and which after reaching its position is about as stable as a gate upon loose hinges, will always cause resorption.

A saddle which is perfectly adapted to the underlying mucosa, and which is held there against all lateral displacement, will always cause a hyperemia and finally resorption.

A saddle which is perfectly adapted to the underlying mucosa, and is held there against all vertical and lateral yield, will bring about a distinct pathological change in the underlying tissue, finally resulting in resorption.

The sequellæ of these pathological end tissue changes are systematically far-reaching in deleterious effect and must be avoided by the following means:

**Correct
Construction
of Saddles.** A saddle must be perfectly adapted to the underlying mucosa and it must be held in place by parallel attachments, which engage parallel abutments and which will allow a limited vertical bucco-lingual, a linguo-buccal and to a very limited degree a mesio-distal yield.

The extent of vertical yield is determined by the elastic limit of the subjacent tissue upon which the saddle rests. A halt must be called before the limit of displacement has been reached.

The extent of bucco-lingual and linguo-buccal yield is controlled by the degree of the arc created upon the attachments, and the degree of the arc is determined by the conditions of the subjacent tissue being greater for soft and easily displaced tissue, and less for hard and unwillingly yielding membranes.

The mesio-distal yield is effected by having the attachments which hold the saddle in position consist of double metallic plates, elastic in action, with a minute space between them.

A saddle perfectly adapted to the subjacent tissue and held in place with attachments as described will not cause any resorption, provided that subjacent tissue is organically efficient and without taint.

The Planning, Moulding and Casting of Saddles.

**Impressions
for Saddles.** An impression tray which is large enough to take in all the area desired and which will not strain the mouth is selected.

A base-plate wax barrier is formed around the distal part of the tray to prevent the flow of the impression material into the throat.

The impression tray is filled with a creamy mix of plaster, and with a broad spatula, the parts to be reproduced are covered with the plaster.

The tray is carried into the mouth and gently brought into position to cover the parts.

If it is an upper impression, the tray is held in place with one hand, while the other extends the check and upper lip of the patient and brings it down taut over the plaster-covered buccal and labial margin of the tray.

If it is a lower impression, the tray need not be barriered against the flow of impression material and the other procedure is the same.

When the plaster has become sufficiently hard, the tray is removed and the impression is carefully taken out of the mouth in sections or as one piece if no undercuts are present.

If the impression is in several sections these are carefully assembled and waxed together in the tray.

**Method
of Pouring
Cast.**

The impression is now covered with a thin separating fluid-shellac, or thin colored sandarc varnish. When this has become dry it may be thoroughly soaped and the cast is made with a good hard plaster.

It is helpful to surround the impression with a sheet of wax or paper so as to confine the model plaster, and it is best to insert the model plaster into the impression in small quantities with the aid of a small-sized badger hair brush until every part of the impression has been covered with a thin layer of the model plaster. Larger quantities may then be added until the required bulk is obtained, when the impression containing the model plaster is inverted upon a glass slab and left there until the cast is hard enough to be separated from the impression.

No satisfactory substitute for model plaster for saddle purposes has as yet been found.

The artificial stones at present obtainable are not suitable for this purpose; their working qualities are unreliable and the results uncertain.

When the cast is sufficiently hard it is carefully separated from the impression and trimmed to symmetrical form.

**Planning
the Saddle.**

With a soft pencil the shape and extent of the proposed saddle is marked off and two definite landmarks, such as gingival margins of adjacent teeth, or protuberances, are included in the area.

A broad groove is cut into the model lingually or palatally and buccally or labially. This groove begins about 2 mm. below the pencil marks and may be all of 3 mm. deep and 3 mm. wide.

The model is lubricated with a thin oil and a sheet of Platcheck wax, of suitable thickness and sufficient size, is softened in warm water, 110 degrees F., and placed over the model.

A ball of absorbent cotton is dipped into the warm water, and with this the wax is gently but efficiently patted or swedged to place. When the adaptation is satisfactory the saddle is trimmed to outline as indicated by the visible pencil mark.

If a relief for displacement of subjacent tissue is to be provided, which is only necessary when the saddle is to be extensive enough to carry more than three teeth, the position and extent of this relief is determined upon, and with a lance a circular section of the wax is removed.

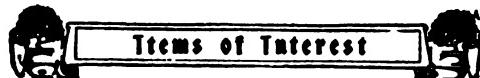
A piece of Platcheck wax about 3 mm. larger in diameter than the area exposed is placed over the opening, but not forced into it, and with a warm spatula it is joined to the wax saddle.

A narrow strip of the same wax is placed over the ridge for reinforcement, and such other places as may be subjected to marked stress are reinforced into the same manner.

A small quantity of inlay wax is added to the centre of the saddle and into this the slightly heated sprue-wire is inserted in such a manner that when invested there will be a nearly equal quantity of refractory compound all around the saddle.

Investing Saddle Patterns. The ideal way of investing patterns for saddles is to insert the sprue-wire in such a manner as will bring the sprue hole and all the saddle area into one continuous line. Unfortunately, the range of our present casting machines and flasks is entirely too small to allow such procedure, so that we are forced most often to insert the sprue-wire at right angles to the saddle, and are thus compelled to cast into 360 undulating radii of a circle; a difficult procedure, even under favorable circumstances.

When the sprue has been properly placed, the wax is chilled with cold water, the refractory compound is mixed, and with a small brush the entire area of wax is carefully covered with a mix, with which the groove upon the model is also filled to overflowing, so that the mix which covers the wax and the grooves will flow into one mass, which is gradually added to until a body of refractory compound from 2 to 3 mm. in thickness has been built up over the model and sprue-wire.



When crystallization has taken place, the surplus is carefully trimmed away until the margin of the wax saddle becomes visible all around.

The model is smartly tapped upon the bench several times, and the saddle will be found to loosen; or compressed air may be blown against the model at the margin of the saddle. Practice will facilitate this part of the technique.

The sprue is now inserted into the crucible former and another mix of refractory compound is made.

When this is ready, the crucible former and partly invested saddle are held under the running cold water for a few moments, and the now exposed and as yet uninvested area of the saddle may be carefully covered with the refractory mix, which must join the first investment without giving up any part of its water of crystallization.

When all of the saddle has been covered, the flask is placed over the crucible former and filled with the compound by pouring the latter in from the side until it rises to fill the flask. The crucible former is now held with two fingers of one hand, while the two fingers of the other rotate the flask upon its seat on the crucible former back and forth several times to insure a homogenous mass.

When crystallization has taken place, the surplus is trimmed off, the crucible former is removed by rotating it to the right, the sprue-wire is heated by holding the flask over a small Bunson flame, the flasked compound is carefully dried under a low heat. When steaming of the compound has ceased, the heat is raised, the wax is thoroughly burned out and the saddle is cast.





Society Papers

The Correct Treatment of Pulpless Teeth Must Eliminate the Possibility of Periapical Reinfection.

By M. L. RHEIN, M.D., D.D.S., New York City.

Illustrated lecture delivered before the Central Dental Association of Northern New Jersey, December 1914.

It is a great pleasure for me to be present this evening. I do not feel as a stranger in your midst, although I have not attended your meetings as frequently as I would have liked to, my presence has not been entirely unknown to you in the past.

As far as the general principals of pulp technique are concerned, they can be described in a very few words.

The Essential Requirements in Canal Treatment. There are three essential points necessary in proper pulp removal. The first one should be the entire removal of every portion of organic matter that exists within the tooth, and I say that without any restriction. This means that it is necessary to reach the very end, in fact, to pass through the end of every root.

It has often been said to me, personally, that I claim to do this with every tooth. I have never made such a claim. When a man, in the interest of professional operations, devotes himself to pointing out the means which are at our disposal to reach an end, frequently his views are exaggerated beyond anything that he had in his own mind. I say this simply in my own self defense. As our experience in pulp removal increases, the percentage of teeth in which this is not practicable, becomes less, and if you should ask me to-night about what percentage of

cases I find where this is not feasible, I think I could, with entire truthfulness, say that seven per cent. would absolutely cover it. If experience will enable one to handle an operation with that small percentage of failures, there can be no question but that the operation should be strongly advised. Whenever it is impossible to remove all of the organic matter from the canals the tooth must be extracted. There can be no compromise if the danger of subsequent toxæmia is to be avoided.

The second desideratum in pulp technique is that the periapical region shall be entirely free from any pathogenic conditions, and, that means that if any have existed, they must be radically eradicated. In other words, before anything in the way of filling root canals is attempted the parts must be healthy; there must be no pathogenic conditions present, either in the canal or in the periapical region.

The third point is the proper hermetically sealing of the root canal, so that infection, ever after, is impossible, either from the periapical region, or from the pulp chamber of the tooth.

You all have been told of the incalculable injury which infections, resulting from imperfect root canal work, have done to human kind. Every year that dentistry becomes older, the medical profession is going to bring the responsibility for these organic lesions, resulting from imperfect dental work, more and more up to the dentist himself.

I want to make a confession at this point to you, gentlemen. I have been very highly lauded by your President in his introduction to-night, and I believe that to-day I am capable, in ninety-three per cent. of cases, of doing such pulp canal work as leaves the tooth free, not only from present infection, but from future infection. In reviewing my work for the past thirty-five years, as I have done, I have felt very much ashamed of a great deal of the work performed, and as I have noted it year by year, I could see the faulty results of my technique. This gradually led me to the technique which I now pursue. I say this because I think it will make us all feel better to realize that I have passed through the experience that I feel all of the profession must pass through, in order to fully appreciate the questions which are involved.

**Need of Filling
Through Apical
Foramen.**

The main point I want to bring to your attention to-night is, that, leaving a hermetically sealed root canal does not necessarily insure against reinfection, in the periapical region, if infection has previously taken place, unless the root canal is sealed hermetically in such a way that infection cannot reach this region. The message that I want to bring you to-night in regard to this vital point is, that I have discovered, by means of a great many radiographs that I have taken in the past years, that in order to reach such a result it is



necessary that the periapical end of the root must be sealed. I do not care how close your filling material reaches the very end of the root, if the filling material does not pass through the end of the root, and seal every foraminal exit on the exterior of the root, you are absolutely unsafe—that is your patient is—against reinfection, and reinfection.

Where infection has already been present, although you may have absolutely eradicated it, new infection will appear, and you will understand this if you will study the method and manner in which infections of this kind occur.

**Living Pulp
Left at Ends
of Canals.**

Where you remove living pulp and fail to introduce a correct root filling, and you have not had infections in the periapical region, my researches in such cases lead me to the inference that more than

a majority of such cases become infected. I grant you that a very fair percentage of them do not become infected, but the fact remains that they are all liable to infection. The reason why many of them do not become infected is because in a large number of cases, some little portion of living pulp tissue is left at the end of the canal; it is not due to the medication you use. No pulp canal medication is possible that will prevent infection around the periapical end of a root canal, as you will understand if you study the question scientifically. A large proportion of these imperfectly filled root canals do not become infected, because some live matter is left, and the other proportion of such cases which have been imperfectly treated and no infection has resulted is due to the fact that the bacteria producing the infection that passes through the lymph channel with so much frequency, and is so common in these tissues, have not been active in that region, or there has been sufficient immunity at this particular point.

I trust I have made my point clear. Nothing has surprised me more, in my own development in this field of labor, than to have reached such a conclusion. My talk to you to-night will be a great disappointment to me if I do not prove this to your satisfaction from practical cases which I shall show to you.

**Blind
Abscesses.**

Before I put these pictures on the screen, let me reiterate the point that you very likely are familiar with. As a profession, we are not worried about acute alveolar abscesses. We know the gravity of those cases and we treat them surgically, and we take proper care of our patient. But we have come to learn what the little blind abscess does, which does not make itself felt, which is not irritating to the patient, and which the dentist in his blind confidence heretofore looked upon as a successful piece of work, because the patient has never found any discomfort from it.

We have all been educated up to that point. It is those blind abscesses that I want you to look at, and I want you to consider for a moment how they occur. The infection here does not come through the pulp; there is no pus present in such infection. The bacterium, if we speak of it here in the singular number, that is capable of producing pus, has not sufficient power and virility to make itself felt in such a way as to produce an acute alveolar abscess.

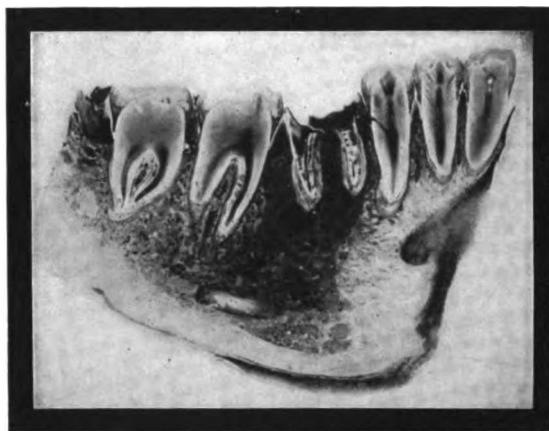


Fig. 1.

Streptococcus Viridans. It is, however, that little devil, the streptococcus viridans that we know has so little power, the most insignificant of bacteria, which has not the power to produce inflammation and subsequent pus, that demands your closest attention. Many dentists and physicians still seem to be unable to comprehend how this is possible. They say, "How can they produce infection when they do not produce pus?" These bacteria, when they produce a focus of infection, simply manufacture a limited amount of toxines, which passess through the defensive envelope which is formed around this little abscess, and it is these toxines which go to the organ that they undermine; and it is this point that I want to have clear in your mind—that we have no pus in those cases. Many of us have been confused by this. Over and over again I have had dentists come back to me and say, "You must be mistaken; I have opened this tooth; there is no filling in the canal; it is open; I have used peroxide of hydrogen; there has been no reaction, and consequently there can be no infection." They are mistaken, the bacteriological laboratory has proven their error. We have here the most insidious infection, without

the presence of any tangible pus. It is these cases that produce severe forms of heart disease; they do not kill in a day, nor in a month, nor in a year, or their connection with bad dentistry would have been recognized long ago; they simply cut off twenty or thirty years of a man's life, and this is a thing which some medical men are learning more about every day. Consequently, when we recognize the fact that this infection comes from the periapical region, and not through the pulp chamber, we have to so regulate our technique that there is nothing exposed around the end of a root that can become infected. In other words, there must be no bacterial nutriment left at the very end of the root. It is impossible to say a root canal has been filled so that wandering bacteria will find nothing to feed upon unless the filling not only hermetically seals the canal, but what is of greater importance, the periapical opening of every foramina. This is the message I bring you to-night.

I regret that time will not permit me to go into detail of technique to-night. I will show you on the screen radiographs taken from actual cases which will demonstrate the fact that when all infection has been removed and the periapical end of the root sealed, then only will ensue regeneration of alveolar structure.

If this is correct it excludes certain materials from being usable as a root canal filling. It excludes primarily every form of embalming material, as no pulp canal medication can prevent the infection of the end of the root canal. It excludes any filling material that will not adapt itself to seal the periapical openings of the foramina. Finally it excludes the use of any material which has any irritating action on living tissue. Gutta percha appears to answer this purpose best, mainly because of its unchangeable physical character and its great compatibility with human tissue.

(The following are a few of the numerous pictures which were shown by Dr. Rhein :)

Case Histories. The first picture is a photograph of a section of the lower mandible, which perhaps illustrates this point a little better than a radiograph. (Fig. 1.)

I have every reason to believe that the alveolar abscess which you see here was the cause of the death of this individual.

Case 1. The history of this case is very interesting. A young girl who had been my patient since childhood, while crossing the ocean during a storm, was thrown from her berth and her face was badly bruised. She remained in Italy for a year and three-quarters. Three weeks after landing her knees began to swell and she was compelled to use crutches from

Fig. 2.

Items of Interest



Fig. 2.



Fig. 3.

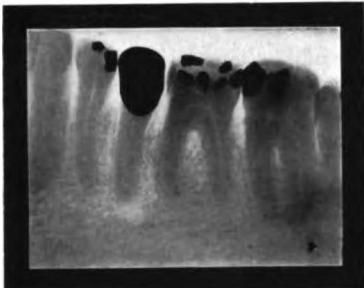


Fig. 4.



Fig. 5.



Fig. 6.

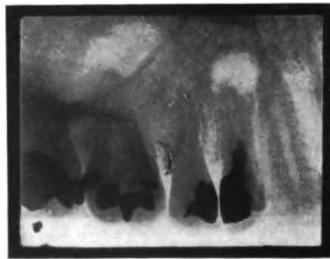


Fig. 7.



that time until she returned home. Upon arriving she was placed under the care of a specialist, but her condition was not improved. It was fully six months after her return before I saw her, when she remarked that for a few moments the day previous she had felt some slight irritation over the second bicuspid. Her mouth looked the picture of normality as to gums, etc. She had always kept her mouth in an ideal hygienic condition, and before the days of the X-ray I would have paid no further attention to the mouth. Fig. 2 is the radiograph taken at that time and shows the outline of the classic granuloma at the end of an upper second bicuspid.

The enamel of this tooth was without any flaw. Immediately upon examining the picture I realized that I had discovered the cause of her arthritis. My next patient was dismissed in order to give her immediate attention. Upon opening into the pulp chamber it was found filled with a reddish brown fluid, but without any indication anywhere of anything which by the greatest stretch of imagination could be called pus. With utmost aseptic precaution some of this fluid was withdrawn in a glass pipette which was passed into the root canal. The expected pure culture of streptococcus viridans was obtained from this.

Fig. 3 is a radiograph of this tooth a few months after the root filling was inserted and there is already distinct evidence of alveolar regeneration. Two weeks after the completion of the root filling the patient was able to dispense with her crutches and there has never been any return of arthritis after a lapse of three years.

Fig. 4 is a radiograph of a gold-capped lower bicuspid taken in October, 1913, in the mouth of a young man about thirty-six years of age, who died in February, 1914, from endocarditis. Twelve years before that the gold cap was placed on this tooth, and it distinctly proves that a gold cap inserted in this manner has the power to kill a man in twelve years. Although he was at once warned of the danger of toxemia, the dentist in whose care he was did not believe there was any infection, because on opening up the pulp chamber no pus was found. It was not until January when, because he was failing rapidly, the tooth was removed and the expected streptococcus was developed. It was, however, too late; a month later these micro-organisms were found in the blood and the patient died.

Fig. 5 shows another typical case of oral sepsis resulting from a gold cap placed over a lower molar.

Fig. 6 is a radiograph of a piece of bridgework sealing in the alveoli numerous foci of infection.

Fig. 7 shows an amalgam filling passing some distance into the root canals of an upper first bicuspid with a marked granuloma at the end of



Fig. 8.



Fig. 9.



Fig. 10.



Fig. 11.



Fig. 12.



Fig. 13.



Fig. 14.



Fig. 15.



Fig. 16.

the root. The patient, a spinster aged about thirty-five, gives a history of endocarditis.

Fig. 8 represents the very starting of infection at the ends of two upper incisors after death of the pulps.

Fig. 9 shows the same case under treatment after the pulp contents have been entirely removed. Gold wires are now passed through the foramina in order to know that gutta percha can be forced through the foramina. This picture shows the wires passing through the ends of the roots. At the next sitting the periapical area is treated by means of ionization, preparatory to filling the canals, and the next picture, Fig. 10, is a radiograph showing the ideal root fillings encapsulating the root ends.

Fig. 11 shows an upper cuspid with a granuloma resulting from an imperfect root filling. This is one of my own root fillings inserted over fifteen years ago, before the day of radiography. It is a frank confession of my own failure at that time and most clearly illustrates the impossibility of doing honest root canal work at this day without radiographic checking. This root filling was at once removed.

Fig. 12 shows the root after the old filling was removed and the reaming of the canal is under way. The gold wire shows us that there still remains some unexplored portion of the canal.

Fig. 13 shows the corrected root filling taken a few years after being inserted and alveolar regeneration is well under way.

Fig. 14 is a radiograph from a patient who was hurt in an automobile accident. The condition of the first upper left bicuspid indicated death of the pulp from injury at this time. Alongside of the injured bicuspid is shown the canine from which I had removed the pulp twenty-three years ago. This root filling is an illustration of the fact that I did insert perfect root fillings at this time when I was able to reach the end of the root. The technique of inserting the gutta percha root filling was the same as used by me to-day. Your attention is invited to the solid homogeneous character of the filling, showing that it hermetically seals the canal and that gutta percha properly packed never changes. The most important value of this picture rests in the fact that the gutta percha is forced through the foramen and retains its position in the alveolar structure without the slightest sign of detriment to this delicate tissue. The absolute normality of the periapical region after twenty-three years is the best evidence of the correctness of this therapy.

The next two slides will illustrate the treatment of the first bicuspid.

Fig. 15 shows the tooth after the two canals have been cleansed, with gold wires projecting through their separate foramina and before ionization has been used. The destruction of the alveolar tissue emphasizes the normality of the alveolar structure around the canine.

Items of Interest



Fig. 17.



Fig. 18.



Fig. 19.



Fig. 20.

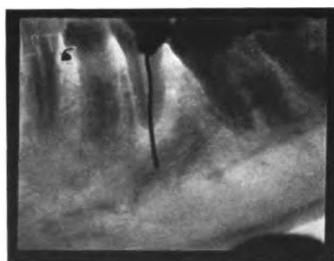


Fig. 21.

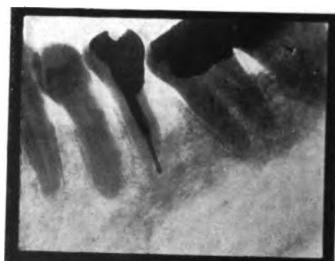


Fig. 22.

Fig. 16 shows the tooth after ionization has been used and the roots filled. The absolute encapsulation of the end of the roots is well shown. It is also worthy of note that the fillings being parallel to each other obliterate their separate parts so as to give the false appearance of one root filling when in reality there are two separate fillings.

How do you distinguish when there is a necrotic area and when there is not at the time of the operation, not waiting for a year to see if the condition

Dr. Gillet.

is all right?

You cannot absolutely distinguish it by means of a radiograph. There are all kinds of questions of angles, etc., that may be deceptive as to the integrity of the cementum.

The history of the case is an invaluable aid. When there has been no previous operative interference it is safe to assume that the cementum is intact as the alveolar structure crumbles up with such ease that the force of the infection is turned against this weak tissue instead of the diseased structure of the root itself. Imperfection in focussing frequently leaves the impression of a defect in the cementum of the root.

Do not take away with you the impression that if the root filling passes through the foramen nothing else is necessary. This is only the final point in the operation, the one which clinches the nail. Every other essential point in the technique must be carried out just as faithfully.

I will now show you a very bad abscess still remaining, very likely getting constantly worse, although the root filling passes through the foramen. The close inspection of this will show that there is plenty of space between the gutta percha and the walls of the canal.

Fig. 17 shows a very bad abscess over the upper incisors; a probe has been passed through the fistula to the seat of the infection. Both incisors have very defective root fillings, the defects extending from the pulp chamber to the ends of the roots. The patient was brought to me for advise by his dentist, who desired avoiding the removal of some beautiful inlays. He wanted me to advise root amputation, but this would be absolutely wrong on account of the imperfection in the root fillings, which must be absolutely removed.

(In order to shorten this report I am at this point omitting a number of slides.)—M. L. R.

Fig. 18 is a radiograph of an upper incisor. There was an old chronic abscess over the central with marked necrosis of the root. After ionization had been used and the root had been properly filled the end was amputated by Dr. Schamberg. This picture was taken about one year

after the operations, and is shown in order to demonstrate the development of the new alveolar process which is progressing very rapidly.

Fig. 19 shows a case that I have frequently exhibited. The radiograph is taken about nine years after two very severe abscesses have been radically cured. The regenerated alveolar structure is well shown and this new osseous tissue must always ensue if all diseased tissue is eradicated and no opportunity left for fresh infection to locate. The last case I will show has also been seen by members of my post-graduate study section.

Fig. 20 is a radiograph of a lower bicuspid showing a marked granuloma around the end of the root. The destruction of the alveolar structure is well marked.

Fig. 21 shows the diagnostic gold wire through the foramen of the root after the removal of the pulp contents.

Fig. 22 is a radiograph taken one and three quarter years after the root has been cured and the root filled. New alveolar structure is now seen to completely fill the territory which in the previous pictures was entirely devoid of osseous structure.



The Central Dental Association of Northern New Jersey.

Discussion of Paper by Dr. M. E. Rhein.

Dr. H. S. Vaughan,
New York. I am heartily in accord with Dr. Rhein, in his attitude on the ideal treatment of pulpless teeth. The technical advances in dentistry during the last twenty-five years, with improved methods of crown and bridgework, have stimulated the saving of pulpless teeth that would otherwise have been consigned to the forceps, and in this way the public has been educated to demand that such roots be saved. This has placed on the dental profession a very great responsibility and, as yet, the dental profession has not responded to this responsibility, but, I think, progress is being made in that direction.

The recognition of oral sepsis as the cause of some forms of pneumonia, of endocarditis, and various other affections, has led the medical diagnostician to consider the teeth at fault until the contrary has been proven, and this has led to the greater employment of radiography in the diagnosis of such conditions, and it has been found, as Dr. Rhein has stated, that teeth filled by careful men, and supposedly all right, in the light thrown by the X-rays have been shown to be the source of infection. These infections may be from the small blind abscess, or the larger bone abscesses, or from even larger areas that have undergone cystic degeneration, and perhaps involved a large number of teeth; then we have them breaking into the antral sinus, or into the nasal chamber, or abscesses that discharge externally on the face, and others discharging internally, into the oral cavity. These conditions often demand very extensive sur-



gical treatment, in order to effect a cure—and all this due to imperfect root canal work.

As radiography has been a factor in discovering this imperfect work, it is just as important, as Dr. Rhein has shown, to use the X-ray to check off the treatment. Radiography is not a luxury; it is an absolute necessity in the light of what is being proven. No man can afford to do root work at all without its use.

The work in the past has been the treatment of existing abscesses; that of the present and the future is prevention, and everything is tending in that direction. The conscientious practitioner must grasp this situation, must strain every effort to follow up and indorse this idea by preventing or fighting, infections about the apices of the roots of the teeth. The medical profession is alive to the situation, and now there is no such thing as an excuse because of ignorance. The dentist must know, and he must do his share of the work efficiently.

I have heard Dr. Rhein discuss this subject of root work before, and I am very glad now to note that he has the courage and the modesty to come forward and say that he has made some errors in working out his present technique. I have heard other men remark that Rhein always claimed to fill every tooth absolutely, and I am very glad he has corrected that statement. However, he has shown what can be accomplished by persistent efforts and has given us an ideal to work towards.

Dr. Henry W. Gillet, New York. Dr. Rhein has provided many things to talk

about, and I do not wish to be talking all night, so I will try to give you a forty minutes talk in the next ten minutes. Dr. Rhein's assertion that it is essential to seal the apex is correct; the demonstrations of the disastrous results of failure to do so are becoming so frequent, that there can be no exception taken to his general statement. The only loop hole there is for us is in the fact that so many radiographs show roots not filled to the apex in which there had been no trouble. That does not necessarily mean that there never will be trouble in those roots, but it does mean that the men who observe strict asepsis in root canal technique will probably have their reward on radiographing those teeth in finding a lesser proportion of trouble in their cases than will be the case with the men who have been careless in their technique.

For a long time it has been my custom to constantly apply the rubber dam when opening, or when working in, a root canal, and to clean away all débris, and flood the whole exposed field with ninety-five per cent. carbolic acid, and then with ninety-five per cent. alcohol before entering the canal.

In my hands, no instrument ever enters a canal which is not either just freshly out of the sterilizer, or freshly passed through ninety-five per cent. carbolic acid. Dr. Hartzell's technique is much the same, except that he uses iodine in cleaning up the field of operation in the place of carbolic acid. With the recent advances in our sterilizers this technique is not burdensome.

Every man who had adopted radiography in his daily practice acknowledges that in scanning his own work of the past the failures which surprise him most are in the straight roots. I will venture to say that half the men in this room will, in private conversation, if they have not had experience in radiography, declare their ability to constantly fill ordinary straight roots to the apices. I will undertake to say that if they will put themselves in the way of checking up by efficient radiography those teeth they are sure they have filled to the apices the result will provide them with some mighty big surprises. It happens frequently that I find single-rooted teeth that I thought I had filled well that are not filled more than two-thirds or four-fifths of the way up. If it were only with my own work that we were having that experience I would doubt my technique, but every man I know who has taken up radiography is having the same experience, and I know of no man who has taken up radiography in his daily practice, where he can take his patients into his own X-ray room and see the wet film in his own hands within six or eight minutes, who does not say that radiography is essential to the proper conducting of his practice. My own feeling is that if my X-ray apparatus were to be taken away from me to-morrow and I could not have it again, I should never touch another pulpless tooth.

Now for a word on another side of the question.

**The Question
of Cost of
Radiographs.**

I find men hesitating over the expense of the equipment, expense to the patient, whether they can collect the money, and the difficulty of doing the work.

All those things are simple matters; they are just bug-a-boos, that you are building up to scare yourself with. You can get competent X-ray apparatus for anywhere from three to six hundred dollars, and most of you can take care of that expense; at any rate you have got to take care of it in some way, otherwise you have no defense and you are going to have a bad time inside of the next five years in maintaining yourselves in practice. If you cannot manage that individually, club together, and get ten or twenty men to purchase the apparatus. Perhaps you may live in a town where there are not as many practitioners as that; there you might get one man to do radiography and provide him with a good income. Any ten busy dentists ought to keep one radio-

grapher occupied, and if ten do not, get twenty-five, and when that man becomes reasonably busy it will be found an attractive opportunity for a young graduate who will fit himself properly to take radiographs at one, two or three dollars a piece. It is the same in your own work; just as soon as you are doing as much radiography as you should be doing the question of cost disappears. One man in New York City who does a good deal of radiography figured that in his practice the expense, aside from the few minutes of his time that it takes, means twelve cents a piece, including interest and depreciation of his outfit. As knowledge spreads on the subject you will find patients demanding radiography and going to the men who use the radiograph in their root canal work. In a large city ten dollars is not an unfair price for a first radiograph and further exposures of the same tooth may well be at a smaller fee or if there are several needed the charge for some may be omitted. Five, three or even two dollars may be a right fee in smaller cities where expenses are less.

Ionization. Just a word about ionization. I am much interested in Dr. Rhein's work in that line, and acknowledge the definiteness of his proof that in some of his cases something has brought about regeneration of the bone in those cases, but I am not as positive as Dr. Rhein is that it is ionization as he defines it. I recently had an opportunity to talk with Dr. Price, who had made some of the most careful investigations concerning the possibilities along that line, and he says that the theory advanced by the advocates of ionization is impossible, and that the improved conditions they demonstrate must be accounted for in some other way. I would like very much to know what the introduction of gutta percha has to do with stimulating the vital processes at that point. The case described, from the hands of a Tennessee dentist was interesting on that point, and it recalls to my mind, that in the early nineties, Dr. Forrest G. Eddy, of Providence, was responsible for the adoption of the practice, in that portion of New England at any rate, of concluding the treatment of fistulous teeth by forcing chloro-percha solution through the root until it appeared at the mouth of the sinus on the gum and then filling the root in the ordinary way. Many operators reported the successful healing of fistulae following this procedure.

I was much interested in Dr. Rhein's remark concerning the patient who attempted to dictate to him what was to be done. There is a text for a whole sermon right there. We are all familiar with a certain type of individual who, being successful in his own particular business, feels that his judgment should be accepted by all. He even expects to tell the professional man what ought to be done. When that type presents

itself it is well to kindly but firmly let him understand that your opinion must govern or he must go elsewhere.

We must develop procedures that keep pace with increasing knowledge or gain such a reputation as will set our profession back a generation. In the field we are considering I know of no better type of root filling than that which Dr. Rhein has advocated to-night.

I came here upon Dr. Rhein's invitation with the **Dr. M. T. Schamburg**, view of taking serious exception if he was unable to prove to me certain statements that he had made in New York.

I was highly sceptical from a pathological standpoint as to whether a foreign substance passed into the cancellous structure of the bone, about the end of the tooth, would be of any material benefit there. I must admit he has satisfied me that under strict aseptic procedure small extrusions of gutta percha may do no harm. Like many of you I resented the proposition that gutta percha passed through the end of the tooth would cause regeneration of bone. Dr. Rhein to-night claims that it is not the stimulation of the gutta percha that causes regeneration of bone. Now I am inclined to view the protrusion of the root filling merely as an index of the thoroughness of the work. The fact that the gutta percha goes through the end proves the work complete. However, it is clear from the pictures that Dr. Rhein has shown, that even after perfect root work abscesses may form if the periapical region has not been cleared of infection. The projection of gutta percha into the tissues is not essential as Dr. Rhein has demonstrated, in cases where root amputation has been performed. If everything is dealt with in a thoroughly aseptic manner and the canal is filled up to the point of root amputation, I do not believe there is any need for the gutta percha to protrude; in fact I believe it might be a hindrance.

Dr. Rhein brought out another point I want to emphasize. In cases where there has been no infection around the end, where you have taken out the pulp of the tooth while healthy, the root need only be filled to the end, providing you have removed all organic matter from that pulp canal, and you need not try to force it through into the healthy tissue.

You will notice that the things that have been learned in this field have been discovered more or less accidentally. I believe Dr. Rhein's observations have been largely due to radiography, and I want to assure you gentlemen, that the method Dr. Rhein advocates is not something for him to do alone, but it must be done by the whole profession, and it can be done. One of your own members this evening in a very modest way, handed up a radiograph that he had taken two weeks after he had installed an X-ray outfit, and he had radiographed a tooth that was as perfectly filled as any Dr. Rhein has shown.

I am intensely interested in this subject, not because I fill root canals; in fact I scarcely know why I should talk on the technique of it. I do wish to discuss the extensive involvements arising from these apical infections. I believe the blood stream itself is largely affected, and that a great many secondary conditions are brought on from this cause. There is scarcely a case of disease about the jaw which I operate on, in which the patient does not volunteer the statement that he never felt better in his life than after the operation. The question is a most vital one and it must be taken up as earnestly as Dr. Rhein has done. If ever Dr. Rhein has vindicated himself in regard to root canal work it has been here to-night. He does not pose as a man who is able to fill every root canal; he has been much condemned for claims he has not made, and I am proud to be here with him to-night with such a display as he has made, not alone of the facts but of his willingness to bring out his own shortcomings in the past in root canal work and in his search for the truth. I know of nothing that has come out in dentistry within recent years that carried with it so much importance, because, with a faulty foundation, how can you build up any tooth structure? Of what use is all the bridgework in the world if the foundation of that bridgework is faulty and is a menace to the health of the patient? If the tooth is worth anything to the patient, his health is worth very much more, and we are selling him a gold brick when we do work that is bound to do him more harm than good. Unless this question of pulp treatment of teeth is seriously taken in time by the dental profession, the medical profession and the lay public are going to rise in indignation and dentistry will almost come to the point where the man in England probably imagined it to be when he made the statement some time ago that a patient would be better off without any teeth.

In fact, one individual over there advocates the extraction of all teeth. If he had said he would extract every tooth in which the pulp canal treatment is not correctly done I would highly indorse his proposition. In fact, gentlemen, I am called upon almost every day, by patients who have been referred to me by physicians, for the wholesale removal of bridgework and bad dental work that is causing infection, and I believe there will be a revulsion of feeling so that plate work will, in a large degree, succeed bridgework in the hands of men who are not able to properly prepare the foundation for their dental work.

Dr. M. E. Rhein.
(Closing)

For thirty years I have seen the results of oral sepsis, and I have had some very unpleasant experiences in trying to call the attention of the profession to this. Now one of the greatest pleas-

ures in my life is to have lived to see the day when the profession in this country is awakening to the truth.

There are just two practical aspects of this question. Everything depends on the value which any individual patient places on the salvation of his tooth; how much he wants a bridge rather than a plate; and it is the duty of the dentist whom he consults to explain to him what pulp work now means, instead of what it has meant in the past. If he is unwilling to meet your requirements as to expense, then it becomes your duty to tell him that the only alternative with such a tooth, as far as the safety of his health is concerned, is to have it removed.

**Pulp Canal
Work in
Infirmaries.**

If I have impressed you with this point, I want to ask you, if the facts are true, how are you going to meet these conditions in the city dental infirmaries, such as are starting up all over the country and those you have organized so liberally in this city. How are you going to handle pulp treatment in the teeth of the children of the poor? Is it rendering a charitable service to do the kind of pulp treatment that is done in dental infirmaries at present, leaving children with a strong probability of endocarditis? Some of the diseases coming from the same source were mentioned to-night and I could go on and tell you about intestinal diseases; I could tell you about cases of gall stones; of ulcers in the stomach. I could tell you of all kinds of diseases that I have traced entirely to oral sepsis. We speak of endocarditis because the muscles of the heart seem to be the first that are affected. I claim that it is impossible to do proper pulp work in dental infirmaries. There is not the time, and so the operators should chose the lesser evil. We must sacrifice the teeth rather than endanger the health of these children. I claim that in our dental infirmaries of to-day, with our present knowledge of the subject, it is our duty to extract, and not stultify ourselves with incompetent pulp work. I have in my pocket a package of ten films. On Saturday afternoon I had one of the dentists at one of the orphan asylums in New York, bring to my office ten different cases where pulp work had been done in the mouths of the children dating back to 1910. One of them, done within six months, was absolutely free from any infection, but that was the only one of the twelve; with two of them the films are not quite distinct, and in the other seven the infections are most pronounced. Some of the cases were root amputations, but most of them were fillings with various substances, and the infections are as great as any I have shown you to-night. Here are children in one of the orphan asylums supposed to be securing the best kind of dental service, and what have they re-

ceived? One of those children came in limping, and I have no doubt it is due to an apical infection.

I am sorry Dr. Gillet has gone because he had not understood views on ionization. I do not claim it helps bone reproduction. I did not make that statement, and I did not mean that the use of ionization is for that purpose. In the case illustrated in Fig. 18 there was no ionization used, yet we see how nature reproduced bone when the diseased tissue has been absolutely removed, and no reinfection takes place, just as nature reproduces every other tissue that you give a chance to heal; just as the bone is reconstructed when there is a fracture of the bone. Why should there be an exception in the reproduction of the bone in the alveolar structure? There is none. What I claim for ionization is that by its use, if the periodental tissues have not been injured so that the cementum of the root has become necrotic at that point, it is possible absolutely to destroy all of the infected part.

Ionization as I use it has conclusively proved to me that it will get rid of all of the pathologic tissues as thoroughly and effectively as we can do it with surgery. I claim that the bone will regenerate in spite of the gutta percha point if the gutta percha point is free from any septic possibilities around it. We all know how kindly tissues take to gutta percha; there is only one other thing I would rather put there if it were possible, and that is a high grade porcelain. I do not like to force a lot of gutta percha through, I would rather leave the ends of the root as Dr. Schramberg showed on his slide.

**Root
Filling
Materials.**

And that illustrates another advantage of gutta percha, which is that its softness enables us to compress it against the end of the root—a thing that no other root filling will do. Paraffin has been spoken of, and however much we can rely on it to remain intact in the root, we know that it will not remain on the outside of the root, and that puts paraffin out of the category of efficient root filling materials. We want no irritating root fillings; we cannot afford to use oxy-chloride cement and have its constant irritation prevent bone regeneration; we must have something that will not irritate the tissue.

I was asked by Dr. Waldron to explain how I use the gutta percha. You are supposed to have your root canal absolutely free to the end, clean. The last thing that I do, after I have used ionization, is to syringe out the canal with a solution of bichloride of mercury in hydrogen dioxide, one to five hundred. I use that solution because of the fixed amount of bichloride of mercury that is left in the microscopic openings of

the tubuli. I then have prepared in my office a solution of base plate gutta percha in chloroform. I do not want any oily preparation of gutta percha. I have used gutta percha dissolved in eucalyptus and other oils, and I do not want that kind of a preparation because it is impossible to extract the oil from it. I want to get rid of every drop of the chloroform during the filling of the root canal. The chloroform is only a medium for carrying the gutta percha into the canal. I use a series of gutta percha forms that are shaped like wire rather than cones. I have abandoned the gutta percha cone because it is a dangerous gutta percha point to use. I do not say that it cannot be used, but you are apt to make an imperfect root filling with a cone because you are liable to come to that point where you block the canal when the thick end of the cone can go no further.

**Technic
of
Filling
Root Canal.**

Having washed out the canal with this solution I now dry it with warm air, and I use what is known as the Young broach and wrap it with a fine wisp of cotton. I frequently introduce a little chloroform first and follow it up with the hot air. I want the

chloro-percha when it goes into the root canal to meet a dry surface all around, to which it will adhere all the way down, so that when I fill in with a point of gutta percha, I am not only forcing the gutta percha through the opening in the foramen, but literally into the microscopic tubuli, in the decalcified dentine, and, of course, it is understood you are to do this with absolutely aseptic precaution. I scrub my hands the very last thing before I introduce the chloro-percha, and my assistant does the same. My gutta percha points are now placed in a bath of ten per cent. formalin, so that there can be no infection on the gutta percha. With a pair of forceps I take the gutta percha point onto the napkin and fold the napkins over it carefully; the assistant stands at the left side of the chair, with an alcohol lamp and with my aseptic forceps, I introduce the point carefully into the root canal and, with gentle pressure, press it down as far as possible and then proceed to follow up the process of forcing my gutta percha point carefully down. Then I add another point in the same way and may add a third point according to the diameter of the canal, compressing it as well as I can with a plugger. I now take that plugger point and wrap a little wisp of Japanese paper around it, and dip that in chloroform and introduce that plugger with the chloroform dipped paper into the canal and proceed to tamp that gutta percha with the plugger, the same as a laborer tamps his concrete pavement, doing it again and again; you can only learn by experience how much of this is requisite. When you have finished your gutta percha points are forced into one homogeneous mass that absolutely fills that canal. Your chloro-

form is being forced out the end of the foramen at one end and at the other is easily evaporated with your cold air. If I am going to use a root for a crown, I sometimes use only half of a point of gutta percha, and if I am going to bring the filling away up, I may use six or eight points, running down to a number five or a number four. When I am all through and my assistant has stopped blowing the cold air on the gutta percha so that we know the evaporation is complete, I cover the gutta percha with oxy-chloride of zinc cement. That is placed over it to prevent any possible infection from the crown of the tooth into the root canal. I have never detected the faintest odor in any root canal that I have filled and as you have seen to-night I have opened a number of old fillings of my own and it has simply been a question of the difficulty of reaming them out.

I wish I had the time to go into the subject of radiography, because I would like to point out to you that when I said that seven per cent. of the cases is a safe allowance for teeth that cannot be properly filled, it is by means of radiography I have been able to determine that percentage; by its use you are able to see exactly the shape and form of the root.

I must apologize for going on so late, but it has been because of the way in which you received me, but I must stop at this point and I thank you again and again for the generous reception you have given to me.





The Sealing of Apical Foramina with Gutta Percha and the Regeneration of Bone Thereabout.

Science is "Knowledge gained and verified by exact observation and correct thinking" (*Standard Dictionary*). Hence no fact alleged to be scientific can be counted a scientific fact, so long as men competent to make exact observations and to think correctly, maintain opposing views thereon. Where such opposing views exist about a fact of importance, it follows that discussion must continue until one view alone be adopted by all the disputants. Such discussion can lead towards final conclusions only when conducted impartially, dispassionately and impersonally. In scientific debate there can be neither fear nor favor. The following views are volunteered with full conception of the above restrictions, and the writer is quite as willing to be proven wrong, as to prove himself right.

In the *Dental Cosmos*, for October, appears a paper read before the New York State Dental Society by Dr. Clarence J. Grieves (p. 1112-1127) and a discussion thereon (p. 1143-1155), to which latter the present writer was a contributor. The closing discussion by Dr. Grieves, with the consent of the society, was written after the meeting, and it is this closing argument which reopens the subject.

As a contribution to the discussion as to whether or not new bone may be regenerated about or around gutta percha, I exhibited radiographs of two cases. In one an implanted tooth had been lost by re-

sorption of the root, which uncovered the gutta percha in the canal, and the radiographs show new bone built tight against this gutta percha. In the other a gutta percha cone had been protruded through an apical foramen into a space caused by an alveolar abscess, yet from a subsequent radiograph I declared that the new bone had built about this protruding gutta percha (see illustrations, *Dental Cosmos*, p. 1151).

In response Dr. Grieves has this to say :

"Dr. Grieves.—I wish first to thank Dr. West for his remarks, and to take up the slide which I requested Dr. Ottolengui to show us. You will recall that the tooth, extracted and filled with gutta percha, with its apex trimmed as usual, had been successfully implanted for some time. The series of excellent slides shows a progressive resorption of this root, as is observed in all implanted teeth, which finally reached clear down to the gutta percha root-canal filling, leaving it in perfect contact with the alveolar bone. It is well recognized that all implanted teeth are attached by ankylosis, and do not normally sway as do those with normal periodontal membrane, and that the deposit of alveolar bone in the resorative bays cut in the roots holds the tooth rigid; it is also known, from comparative anatomy, that this very rigidity finally accomplishes the destruction of every implanted tooth, because in the freely moving mandibular articulation of all the mammalia there is no known instance of the occurrence of this type of "bone of attachment" which is found in the lower orders. The point I wish to make clear is that this gutta percha filling was at first firmly fixed in the alveolus by the very process of resorption and deposit, the reparative process in a tissue, the cementum, with which the cells can lie in physiologic contact, and it was not, as I said in the paper, swaying as a normal mammalian tooth attached by periodental membrane should.

"The last slide more than proves my contention, because as soon as enough of the root was absorbed to allow motion, and the tooth began to tilt, the gutta percha root-filling, firmly held in the bone, fractured. In the last slide you noted the large area about the portion with the gutta percha apparently protruding, which moved with the tooth, and particularly good bone about that which did not move. I am deeply obliged to Dr. Ottolengui for bringing this slide, and I call your attention to his statement that he intentionally perforates and projects his filling only in abscess cases, or where there has been destruction of periapical tissue, while Dr. Rhein claims to perforate and protrude his filling in every case."

Reply to
Dr. Grieves.

Dr. Grieves here claims that the bone built tight against the gutta percha exposed through resorption of the root of the unimplanted tooth was so built because of the fixation of the parts by ankylosis, and

he points to the "large area" about the gutta percha which protruded through the root of the other tooth, declaring that this "large area" (meaning an area unfilled with new bone) existed because of the normal sway of the tooth in its alveolus.

I believe that Dr. Grieves here overestimates two things. First, the alleged unfilled area about the projecting cone of gutta percha seemed large to him because of the magnification of the picture when thrown on the screen. The radiograph, which by positive measurement pictures the parts practically of exact size, discloses the fact that this unfilled area is so minute as to be negligible. (See illustration in *Dental Cosmos*.) Secondly, I think that Dr. Grieves overestimates the extent of sway of a tooth root in its socket. It does not swing as a pendulum freely moving in space, but its soft tissue attachment to the alveolar bone permits a slight movement under stress. Moreover this movement is more vertical than horizontal. The so-called apical space, is a space only in the sense that the distance between the apex of a tooth and the extreme bottom of its alveolus, is greater than the distance between its side, and the walls of the alveolus. But this "space," both below and around the root, in a state of health is filled with pericementum, the elastic ligaments of which both permit and restrain the movement of the root when stress is met.

I cannot believe that this movement could interfere with the slow processes which produce a metamorphosis of the granulation tissue which first fills a pathologically produced cavity at the end of a root, into true alveolar bone, especially when I think of fractured jaws which reunite in spite of the fact that no interdental splint yet invented ever immobilized the parts so that they moved less than the distance of a root swaying in its socket.

**The Real
Point of
Importance.**

But as a matter of fact we seem here to be discussing a point of slight importance. Even granting the existence of a "large area" about the projecting gutta percha point which has not been filled with bone, is it not probable that this locality which shows as a light area in the radiographs, is at least filled with perfectly healthy granulation tissue? And if so does this not establish the only fact which the illustrations were introduced to prove, viz., that an aseptic point of gutta percha might protrude through a root end, and yet cause no interference with a perfect healing?

**Protrusion
of Root Fillings
Through Apices.**

It never was my intention to advocate the protrusion of gutta percha cones through the apices of roots. But it is a fact that with the technique which I do advocate, such an accident is occasionally unpreventable unless we stop short of reaching the apex when introducing the root canal filling, but since we have proven that such protrusion of a cone produces no trouble if the operation be aseptic throughout, it is far less undesirable than leaving the apex unfilled, since it can be abundantly shown that such unfilled apices always invite infection, and that these invitations are commonly accepted with dire results to the patient.

It almost seems as though Dr. Grieves must misunderstand those of us who advocate the extension of a root filling apex through the apical foramen. He speaks of my "perforating and projecting root fillings." Elsewhere he tells us: "You must either protrude the gutta percha point every time, or not at all, to be consistent." It seems a fair deduction from this that he must believe that the advocates of this method of sealing the apical foramina of teeth deem it desirable to protrude a gutta percha point through the foramen. But no one to my knowledge has ever advised this. Certainly I have not. The protrusion of the gutta percha point is never intentional, but it is sometimes an unavoidable accident, and for this reason cases where such protrusions have occurred have been watched and periodically radiographed, with the result that I have several series of radiographs which, at least to me, seem to demonstrate progressive improvement with increasing deposition of bone. From these demonstrated facts I argue, not irrationally I think, that the protrusion of a gutta percha point need cause no anxiety, provided the point be absolutely aseptic. But I do not advocate nor advise the intentional "perforation and projection" of the point which Dr. Grieves attributes to me. On the contrary, in the very case illustrated with radiographs showing what I conceive to be growth of new bone about a projecting gutta percha point, I specifically mention the fact that the point passed through the apex "accidentally."

In describing my own technique, in this discussion, I first said that where we remove a living pulp and have every reason to believe the pericementum to be alive and healthy, "I can see no reason why we should

protrude broaches, wires or gutta percha or anything else through the apex of the tooth." Then later, in cases of known infection, after thorough sterilization I say, "the canal must be filled with chloro-percha sufficiently fluid to be forced into the extra foramina and through the major foramen out of which it should exude so as to flow over and around any part of the apex which is denuded of pericementum, thus not only coating the root end with an aseptic non-irritant shield, but at the same time covering over the outer openings of the extra foramina."

There is nothing in this language which can be construed into the advocacy of the intentional protrusion of gutta percha *points*. Nor is it advisable that any excessive quantity of *chloro-percha* should be forced through. The operation of forcing *chloro-percha* (not gutta percha points) through the apex, if skillfully done will encapsulate the root end provided it be denuded of pericementum, and will fill the funnel-shaped orifice of the canal. In connection with funnel-shaped, crater-like apical foramina, we often get radiographs in which the root filling appears to have a knob at the end, the truth being that this knob-like mass does not extend beyond the apex, as it appears to do, but merely fills the aperture, as no gutta percha point ever could do.

I hope that I have here made it clear that I do not advise the projection of gutta percha points through root canals, though I do deem it necessary that the root filling should adequately seal the apical foramen, to accomplish which it must always pass fully through the foramen, and in cases of infection a sufficient quantity of *chloro-percha* should pass beyond the apex to encapsulate the denuded cementum.

The Medico-Chirurgical to Merge with The University of Pennsylvania.

The following announcement, published in the *Philadelphia North American*, October 13th, will greatly interest the medical and dental professions of this country:

"With the Boards of Trustees of both institutions favoring the proposition, only financial problems remain to be solved before the final acceptance of tentative plans for merging the Medico-Chirurgical College and Hospital with the Medical School of the University of Pennsylvania.

"Special committees of both institutions now have the financial

problems under consideration, and it is believed a definite financial solution may be ready for submission to the Board of Trustees of the University of Pennsylvania on Monday.

"The plan of merging the two medical schools includes the creation of a great post-graduate school of medicine with a \$1,000,000 medical college building on the parkway. In this college the scientific resources of both the University and Medico-Chi would be combined. A movement is also under way to invite the Jefferson Medical College and other medical schools in the city to join in the formation of the greatest post-graduate school of medicine in the country.

"The merger plan, which met with favor from the Board of Trustees of the University of Pennsylvania last Monday on motion of John C. Bell, was approved the same night by the special committee of the Medico-Chirurgical College and Hospital Board of Trustees, headed by Dr. James M. Anders.

'CHI' to Retain Entity.

"Among the features of this merger plan the most important are that the Medico-Chirurgical College shall continue its hospital under the name of the Medico-Chirurgical College Graduate School in the University of Pennsylvania, and that the clinical professors of the Medico-Chirurgical College shall constitute the staff of instructors.

"The scientific professors of the Medico-Chirurgical College are to join the faculty of the medical school of the University of Pennsylvania in instructing undergraduates in medicine, and will retain their present rank.

"The dental school of the Medico-Chirurgical College is to be merged completely into the dental school of the university, the latter taking over both the faculty and students of the Medico-Chirurgical College.

"The present school pharmacy of the Medico-Chirurgical College is to be continued as a distinct and separate branch of the University of Pennsylvania as its department of pharmacy.

"The buildings of the Medico-Chirurgical College not taken away by the Parkway are to be remodeled and furnished, together with additional buildings.

"A new hospital, with 200 ward beds and not less than fifty private rooms, is also to be erected if the present Medico-Chirurgical Hospital is taken by the city, and this new hospital is to have a professor in clinical chemistry and one in clinical pathology, with ample laboratory facilities and a separate X-ray department.



Around the Table

WE WERE ALL AT LUNCHEON one day at the Clift House. Clift House,
 ♦ not Cliff House. The Cliff House is out by the Seal Rocks, where the
 ♦ seals are—sometimes. The Clift House is right in the heart of the city,
 ♦ where the Dentist were—one time. I am talking about San Francisco,
 ♦ but you knew that, of course. Well, anyway, there we all sat, each
 ♦ fellow taking his little sweet roll, from the sweet little Chinese maid,
 ♦ in her pretty blue velvet dress, and trying to pretend he was looking
 ♦ at the dish of rolls, and not peeking at the girl; no, I did not say Pekin
 ♦ girl.



PRESENTLY ONE OF the Frisco fellows turned to me and said: "You
 ♦ have had a lot in your magazine lately about the Average Dentist.
 ♦ What does that mean? What is the Average Dentist?"



"SUPPOSE WE MAKE A RIDDLE out of it," said a Party from Portland.
 ♦ "Put it this way, 'When is a dentist not a dentist?'"



"WHEN HE IS an orthodontist," cried an Angle School graduate.



"MANY A TRUE WORD is spoken in jest," retorted the Portland Person,
 ♦ and the Orthodontist was sorry he had spoken. "The riddle is a good
 ♦ one, and must be answered before you can define 'Average Dentist.'
 ♦ Before we can strike an average we must know what the two extremes
 ♦ are. We know how high a man may get and still be a dentist, but some
 ♦ one tell us how little skill a man may possess before he loses the right
 ♦ to be called a dentist. Again I ask, 'When is a dentist not a dentist?'
 ♦ Don't all speak at once!"

"I HAD AN EXPERIENCE recently," said the man from Salt Lake, "which may throw light on your question. A woman came into my office to ask my opinion upon advice given her by another man. In the upper jaw she had only the six anterior teeth left, and all were afflicted with pyorrhea. The man she had last seen told her that the only way to save her teeth was to cut off the crowns and attach a fourteen-tooth fixed bridge. Although she had not consented to this, he 'treated' two of her teeth before she left the chair. It was partly because she did not wish her six front teeth cut off, and partly because the 'treated' teeth had ached continuously, that she came to me. On examination I found that the fellow had drilled holes in the approximal surfaces of the lateral incisor on one side and the cuspid on the other, and had applied argenitc. Query! As he must drill a hole in the lingual surface to remove the pulp, why drill one in the approximal surface, through which he never could remove the pulp? I think that man is 'no dentist.' Yet he has a license."

■ ■ ■

"NOW YOU HAVE SAID SOMETHING," said the Seattle man. "Where does the dentist who is not a dentist get a license?"

■ ■ ■

"WHY, FROM THE EXAMINER who is not an Examiner," replied the Professor from the University. "You have all heard of Examiners who examine dental graduates, but did any of you ever hear of an Examining Board that visited a Dental School to examine the school, or to discover what the students are taught, or to investigate the methods of college examinations? Where does the Average Examiner learn how to examine?"

■ ■ ■

"WHY FROM THE QUIZ COMPENDS," said the Salt Lake man. "The riddles all seem easy to-day. We started with the Average Dentist, and here we have drifted to the Average Examiner. But I guess that is a logical sequence, though I think that it should be reversed, for surely it is the Average Examiner who licenses the Average Dentist."

■ ■ ■

"THERE IS NO DOUBT," said the Portland Party, "that if we had more Examiners above the average, the Average Dentist would possess a higher average of genuine usefulness in the community. But perhaps the Average Dentist is good enough now. It is the man below the average that I am asking about. The dentist who is not a dentist, even though he may have a license. What is the answer?"

■ ■ ■

"SUPPOSE YOU TELL US, since you asked the question," said the Professor.

■ ■ ■

"WELL, THEN," said the Party from Portland, "take the case described by our friend from Salt Lake. That man not only is no dentist, he is not even a mechanic, and as the case is typical of a condition often met, let us analyze it a minute for the benefit of other dentists who are not dentists, or, better still, for the 'near dentists,' in the hope that they may get nearer. What are the facts? The patient has only the six



❖ anterior teeth left in the upper arch; they are afflicted with pyorrhea,
❖ and presumably more or less loose. The alleged dentist advises cutting
❖ off the crowns and attaching a fourteen-tooth fixed bridge. Our
❖ critical friend here calls him no dentist because he drilled holes in the
æ approximal surfaces for the application of arsenic; but there was
❖ nothing inconsistent in that. If the entire crown was to be cut off
❖ finally, it mattered little where the primary attack on the tooth was
❖ made. My friend here, being a real dentist, takes exception to the
❖ drill hole in the approximal surface, because as soon as the patient
❖ reaches his hands, the idea of sacrificing the crown is abandoned. Ergo,
❖ if the crown is to be saved, and as a hole must be drilled lingually in
❖ order to remove the pulp, now suffering from arsenical poisoning, it
❖ seemed senseless to have drilled the hole in the approximal surface,
❖ which, of course, weakened the tooth unnecessarily."



"WHAT THEN DO YOU THINK was the man's mistake?"



"GOING BACK TO A STUDY OF CONDITIONS, what do we find? Six

❖ anterior upper teeth resisting all the stress of occlusion whenever the
❖ jaws are closed: the attachment of the roots to their socket walls
❖ weakened by disease. The lingual surfaces of these teeth are inclined
❖ planes, and the normal overbite, of course produces a closure of the
❖ lower incisors against these inclined planes. Purely as a problem in
❖ mechanics what must be the result when the power arm, the mandible,
❖ is constantly delivering stressful blows against the weakened resist-
❖ ance of these inclined planes? There can be but one result. Those
❖ teeth must constantly move labially, and as they do so the inclination
❖ of the planes increases, while their power of resistance to the blows
❖ delivered by the mandible proportionately decrease. That is the me-
❖ chanical result. What is the pathological outcome? The environing
❖ tissues about the teeth cannot recover from a state of disease and re-
❖ turn to a state of health when traumatic injuries are renewed daily.
❖ Hence I say that dentist was neither a dentist nor a mechanic. For
❖ what was his solution of the problem? A fourteen tooth fixed bridge.
❖ Imagine such a structure in place, and again let us consider the me-
❖ chanics. The patient undertakes to incise a piece of bread. To do
❖ this he moves the incisive teeth to an end-to-end bite, during which, of
❖ course, the bridgework attached to these teeth and extending pos-
❖ teriorly in no manner relieves the stress upon the upper anterior teeth,
❖ but as the anterior teeth move forward in their sockets during the act
❖ of incision, the bridge extensions drop down slightly, and thus become
❖ two long lever arms for tilting the anterior teeth lingually again on
❖ complete closure of the mouth. But the mischief not only occurs dur-
❖ ing the act of incision, but likewise during the act of mastication, be-
❖ cause the normal yield of the gum tissue will allow a vertical movement
❖ of the bridge extensions with every act of chewing, and these lever
❖ arms bridged to the anterior teeth, must move the front teeth back and
❖ forth in their sockets constantly. Physiologically, therefore, the dis-
❖ ease cannot be cured because of the constant trauma. Yet the fool

- ◆ said that this would be the only means of saving the teeth, whereas it
- ◆ provides the surest way of causing their loss."

■ ■ ■

"I LIKE YOUR ANALYSIS of this condition," said the Seattle man, "and
◆ quite agree with you that a fixed bridge on those teeth would be dis-
◆ astrous. But now, I think we all would be interested in having you
◆ outline a plan of treatment. As you say, those front teeth are suffer-
◆ ing from trauma, but how will any sort of appliance prevent the con-
◆ tinuation of the abnormal stress long enough to permit recovery from
◆ the pyorrhea?"

■ ■ ■

"YOU NEARLY GUESSED IT YOURSELF," said the Portland man. "It
◆ may not be easy, but a masticating apparatus must be supplied with which
◆ the patient can eat without causing stress on the front teeth or the
◆ case is hopeless, and extraction may as well occur at once as later.
◆ Take an analogous case. A man breaks his leg. Do you expect the
◆ bone to reunite if he walks on it constantly? Fixation being necessary,
◆ you apply a plaster splint. If that does not suffice you confine the
◆ patient in bed, and compel disuse of the sick member. There is your
◆ philosophy! Pyorrheal teeth suffering with trauma, must have com-
◆ plete rest; the rest which comes from total disuse if possible. In the
◆ case under discussion, absolutely the first step in treatment should be
◆ a plate over the roof of the mouth carrying bicuspids and molars which
◆ should be long enough to make it impossible for the incisive teeth to
◆ come into contact. This plate must be so constructed as to preclude
◆ all possibility of delivering stress against the lame teeth. Then the
◆ patient must be forbidden to eat with the anterior teeth. Food must
◆ be cut small enough to be passed back to the molar region for im-
◆ mediate mastication; all incisions to be avoided. Treatment of the dis-
◆ eased condition may now be inaugurated with some hope of success,
◆ and what is more, as the disease yields to instrumentation and medica-
◆ tion, lip pressure will gradually force the protruding teeth back to the
◆ normal. When all teeth are healthy and firm in their sockets, a perma-
◆ nent appliance may be supplied."

■ ■ ■

"BRAVO! BRAVO!" said the Professor. "We may not know when a dentist
◆ is not a dentist, but we do know a real dentist when we meet one, and
◆ I guess one lives up in Portland. Anybody else want to contribute
◆ to the theme?"

■ ■ ■

"LET ME HAVE ANOTHER CHANCE," said the Orthodontist. "I think
◆ a dentist is neither a dentist nor an orthodontist when he extracts a
◆ sound bicuspid to 'make room' for an outstanding cupid."

■ ■ ■

"OH! YOU ORTHODONTISTS are too narrow minded," said a fellow from
◆ the same town. "Circumstances alter cases! I have done that same thing
◆ myself, and I guess I am a dentist." "Have another guess, Jack, and
◆ charge it on my check," interrupted a Wit, but the speaker, not one
◆ whit disturbed, continued: "I knew a man once, and judged by the fees

◆ he charged he was 'some' dentist; yet listen to this tale of woe. A patient of mine was in his town and he filled a large cavity in an upper first molar for her. Two hours—thirty dollars. Tooth ached. Third day dentist declared, 'Well, there must be something the matter with the nerve.' He said 'nerve,' not 'pulp,' nerve being more in his line. Treatment: He removed the thirty-dollar gold filling, found a 'horn of the nerve diseased,' amputated said horn, capped wound in nerve, and replaced gold filling. Fees, twenty-five dollars for 'operation on nerve' and thirty for replacing gold filling. Week later, tooth still aching. 'Evidently nerve more diseased than I thought,' remarked the dentist. Filling removed, arsenic applied, nerve removed, roots filled, gold filling replaced. Itemized bill as follows: Treatment of diseased nerve, fifteen dollars. Removal of nerve, three roots at ten dollars each, thirty dollars. Filling of three roots, at ten dollars each, thirty dollars. Gold filling, thirty dollars. Was that fellow a dentist?"



"NO! HE WAS A CROOK!" (Omnes.)



"AS HAVING A POSSIBLE bearing on the subject before us," said my friend from Brooklyn, "let me read you a letter sent to me by a brother practitioner, which I happen to have with me. Here it is. He writes: 'I want you to decide a small bet that I have made with a brother dentist. He told me that he inserted a one-tooth bridge recently and the shell crown fitted so accurately that he was obliged to drill a hole in the crown to let the excess cement escape; and that otherwise he could not have forced the bridge to place. I told him that I considered it very poor dentistry to drill a hole in the occlusal surface of a crown to let out cement. But he insisted that many dentists do that; in fact, he said, that if a man is skillful enough to make a crown fit tight, that is the only way it can be set. He was so sure he was right, he said he would make a wager with me and leave the decision to any first-class dentist, so as you are a first-class dentist, I ask you to decide the bet!'"



"YOUR FRIEND GIVES YOU a very good character," laughed the Salt Lake man. "Did you reply?"



"I HAVE A COPY of my answer with me," said the Brooklyn man. "It reads as follows: 'I can hardly believe the gentleman who made the statement regarding the perforation of gold crowns to permit of their better adjustment was serious. If he really meant it, I am extremely sorry for him. The fact that the cement would not permit of a proper adjustment of a gold crown without such a procedure is no evidence of its being an accurate fit. I should consider it rather an evidence, first, of an imperfect mixture of the cement; second, a ridiculously large surplus, and third and more important than all, an imperfect root preparation. If such a procedure is customary among many "first-class dentists," as you term them, it is beyond my knowledge, and evidently my professional associates are not in that class. Personally, I do not want to be one of them.'"

AT THIS POINT I thought it time that I should say a word. "Well" said

- ◆ I. "Now that we know when a dentist is not a dentist, and when a first-class dentist is not fit to associate with, perhaps I ought to call for the original question, 'What is an Average Dentist?' Let me say that I came West thinking that he existed only in the East, but I found him all along the Lincoln Highway and in all the by-ways, too. So perhaps I can describe him to you. Usually he is a dentist with an average clientele, made up of people who earn average wages. He himself pays an average rent for his office, average salaries to his assistants, and gives an average allowance to his wife for household expenses. But when you suggest to this Average Dentist that he should fill root canals properly, he tells you that it is impossible for him to get paid for doing good work in this particular field, because he cannot charge what the men with rich clients charge. Now the odd thing is that this Average Dentist has no difficulty in collecting fees satisfactory to himself for any other sort of work. He does filling of all kinds—amalgam, cement, gold, and even porcelain. He makes plates on vulcanite, aluminum, or even gold. And he does bridgework. Yes, indeed! He certainly does bridgework. In fact, he is frequently a specialist in bridgework. I have known such a man to cut off two perfectly sound teeth in order to bridge in one missing member. He can persuade the patient to part with two perfectly good natural crowns and to receive in exchange two gold abominations with a false tooth between (I say false tooth advisedly), and he collects a satisfactory fee for this work, yet declares he could not properly fill the roots because the fee was too small."



"ARE YOU NOT A BIT SEVERE?" asked the Frisco Fellow. "Perhaps I am," said I. "Perhaps that sort of a man is not the Average Dentist. I guess he is below the average. But whenever the question of correct root canal work is discussed, we hear this same argument. I thought I had left all that behind me, yet at the meeting here this morning it was just the same old clamor. 'Radiography! Can't afford it! Can't afford it!' Did you ever hear a dentist say that he cannot buy a dental chair? Or a dental engine? You never have! Very well, then! When men come to appreciate the fact that an X-ray machine is just as essential in a dental office as a chair or an engine, then every man will have an X-ray machine."



"OH! VERY WELL," cried the Seattle man. Don't be so solemn about it, and we will all buy X-ray machines to-morrow. It is time to go over to the Congress again, but before we break up, let me tell you one on 'a dentist who is not a dentist.' Not much of a dentist, anyway. A short time ago an elderly man brought him an old upper plate, broken through the centre, and left it for repairs. My dental friend had never had any experience with celluloid, and did not recognize that this was a celluloid plate. Therefore he flasked it, opened the flask, cut away along the line of fracture, packed in some rubber, closed the flask and proceeded to vulcanize. Needless to say, when he opened his flask the plate had disappeared. When the man came for the plate, Mr. Dentist assumed his wisest air and remarked: 'I am sorry to tell you that that plate was so saturated with nicotine that the rubber was completely rotted, and went up like so much tinder when I attempted to vulcanize it.' The Old Man scratched his head, looked puzzled, and finally remarked: 'That's funny! I never knew before that Ma smoked!'"



Memorial Resolution

*Adopted by the Faculty of the Dental School on Thursday Evening,
September 23, 1915, at a Special Meeting, Convened to Commemorate
the Life and Services of Dean Greene Vardiman Black.*

The following resolution was prepared and presented by Doctors Noyes and Gilmer, and was unanimously adopted by a rising vote:

"The Faculty and teaching staff of Northwestern University Dental School enter upon their records this memorial of their beloved Dean, Greene Vardiman Black, M.D., D.D.S., Sc.D., LL.D., who died August 31, 1915, at the age of seventy-nine years.

"Dr. Black was a teacher in dental schools for forty-five years, with an interruption of only three years, during which time he was the first President of the Illinois State Board of Dental Examiners, in which office he continued for four years more after he resumed teaching (1881) to 1887). His first school work was as lecturer on Pathology, Histology and Operative Dentistry in the Missouri Dental College, 1870-1880. He was Professor of Dental Pathology in the Chicago College of Dental Surgery, 1883-1889. During this time, in 1887, he introduced the teaching of dental technique, by which the teaching of technical procedures in both operative and prosthetic dentistry are taught in laboratories, instead of depending, as previously, upon practical work in the clinic to acquire knowledge and skill in technical operations. This was an entirely new departure in dental teaching, which was very soon adopted by most of the schools throughout the country, and finally by all of them.

"He was Professor of Dental Pathology and Bacteriology in the Dental department of the University of Iowa, 1890-1891. In the latter year (1891) he entered the Faculty of this school as Professor of Dental Pathology and Bacteriology till 1897, when he became Dean and Professor of Operative Dentistry, Dental Pathology and Bacteriology, and continued until his death.

"The most important of Dr. Black's books are the chapters he wrote for the 'American System of Dentistry,' 'The Periosteum and Peridental Membrane,' 'Dental Anatomy,' 'Operative Dentistry' and 'Special Dental Pathology.'

"His nature was simple, sincere and approachable, and everyone who showed an interest in dental matters received a cordial welcome and always found him ready to impart knowledge. He was a friendly man and attracted everyone who came within the sphere of his influence. The greatest desire and ambition of his life was to improve the standards and methods of dental education.

"While in practice he was a very exceptionally wise and skillful operator, and throughout his long life he was a hard student, a successful investigator and inventor, and probably the most useful and the most influential man in the dental profession.

"It would be interesting to tell of Dr. Black's studies and investigations that did not relate to dentistry. Two may be mentioned. He at one time made a study of the rings of annual growth in tree stumps to find out which were the wet and which the dry seasons, recorded in the varying thickness of the annual growth, and he found that his interpretations corresponded accurately with the recorded weather reports as far back as there were any such reports. At another time he worked out the life history of thirty or forty varieties of house molds. He was a many-sided man, and could do an astonishing number of different things, and do them better than other men could do them.

"The honor, admiration and affection we all felt for him can be only feebly expressed.

"We also desire to express to Mrs. Black, the devoted wife, our most sincere and deep-felt sympathy in her bereavement. While making full recognition of the services of her distinguished husband, we wish to express our belief that she was no small factor in his great achievements, and we desire to acknowledge at this time the sacrifices she made in aid of the success of his labors."

Dr. Greene Vardiman Black.

The members of the Minnesota State Dental Association wish publicly to express their sorrow in the death of their friend and associate, Greene Vardiman Black, and to that end resolve:

That the loss of a teacher so zealous in the cause of science, so warmly human in his devotion to the best interests of his students and his fellows, so distinguished in his far-reaching influence upon the standards and ideals of scientific education, is irreparable to the profession of dentistry.

That the warmest sympathy be extended to his family in their great bereavement.

IN MEMORIAM

That a copy of these resolutions be spread upon the minutes of the Minnesota State Dental Association, a copy sent to the family of the deceased, and a copy be sent to the various dental journals.

GLEN F. ANDREWS, Chairman

ROBERT WILSON

ALFRED OWRE

For the Minnesota State Dental Association.

Dr. Hereward Burbridge.

Dr. Hereward Burbridge died at his home in Woodstock, Vermont, September 9th, of diabetes, at the age of forty-three.

Dr. Burbridge was born of English parentage, August 9, 1872, in Walthamstowe, Engand, and came over to Canada at the age of fifteen. From there he moved to Windsor and began the study of dentistry in the office of Drs. Williams and Varney. Upon the death of Dr. Varney he entered into partnership with Dr. Williams.

He attended the Boston Dental College (now Tufts Dental College) and was graduated in 1898.

In December of that year he married Miss Julia A. Oakes, of Windsor, who with one son, Edward Oakes Burbridge, aged fourteen, survives him. Following their marriage they moved to Woodstock, where Dr. Burbridge practiced up to the time of his death. Dr. Burbridge was an active member of various societies and had been President of the Vermont Dental Society. He was often tempted to move from Woodstock to some of the larger cities, but his love for his townspeople and their real affection for him made him turn aside from these inducements.





Concerning the Death Attributed to Novocain.

Editor ITEMS OF INTEREST.

Dear Sir:

The writer having been requested by several friends to investigate the rumor that a death had occurred in the Mayo Clinics following the injection of novocain, begs to make known the following. Desiring to ascertain the facts in the case, the undersigned, in course of a letter to Dr. Truman W. Brothy, expressed himself as follows:

"My dear Dr. Brophy:

"Dr. Hinman on his return brought me the message sent by you concerning the death attributed to novocain.

"As you have foretold, some people are having a little unpleasantness with novocain, but this without doubt is due to carelessness, for, if care be taken, even pallor can be avoided, though these injections be made before an inquisitive audience. You will remember that even in college cases the color of the patient always remained the same. If the questions here enclosed will be productive of a reply from the Drs. Mayo, I shall give it publicity, whether or not it is favorable to my hobby."

The questions referred to above were forwarded to the Drs. Mayo and are reproduced below, along with the answers received. That I intended not to be partisan concerning what turned out to be an unfounded rumor is evidenced by my promise to make public the facts whether or not they were favorable. It is regrettable that just when some of the belated practitioners were about to be converted to this most simple, safe and efficient form of producing insensitiveness that such distorted information should gain currency.

Respectfully,

S. L. SILVERMAN,

Professor of Local Anesthesia and Radiology,

Associate Professor of Oral Surgery,

Atlanta Dental College.

Correspondence

June 24, 1915.

Drs. Mayo, Rochester, Minn.

Gentlemen:

- (1) Kindly give patient's history
- (2) Why was novocain chosen as the anesthetic agent?
- (3) (a) What per cent. solution was used?
(b) How much of the drug was used?
- (4) How long after interjection did patient live?
- (5) (a) Was synthetic suprarenin or adrenalin employed?
(b) If employed, was it incorporated with novocain in tablet form or was it added to pure novocain?
- (6) How much suprarenin was injected?
- (7) What was the character of the operation performed?
- (8) Was an endoneurial, intravenous or infiltration anesthesia attempted?

The history may itself answer the 2d and 7th question, and in that event they may be left blank.

Very respectfully yours,

July 22, 1915.

Dr. S. L. Silverman.

Dear Doctor:

Your letter of recent date received regarding the case that died following the use of novocain. In reply, would say that we do not believe that the novocain was a factor in this case, and it could hardly be listed as a novocain death.

Yours very truly,

DRS. MAYO, GRAHAM, PLUMMER & JUDD.

GORDON B. NEW, M.D.

August 7, 1915.

Dr. S. L. Silverman

My dear Doctor:

Your letter of the 27th was duly received and I thank you for it. I am very glad indeed to learn that Dr. Mayo declares that the death which occurred following the use of novocain was by no means due to its action. I know that such rumors spread rapidly, but are most always distorted.

Very sincerely and fraternally yours,

TRUMAN W. BROPHY.



State Society Meeting.

OHIO STATE DENTAL SOCIETY, Columbus, Ohio, December 7-10, 1915.

Secretary, Dr. F. R. Chapman, 305 Schultz Bldg., Columbus, Ohio.

VIRGINIA STATE DENTAL ASSOCIATION, Richmond, Va., Nov. 4-6, 1915.

Secretary, Dr. C. B. Gifford, Norfolk, Va.

National Dental Association.

At the nineteenth annual session of the National Dental Association, held in conjunction with the Panama-Pacific Dental Congress, San Francisco, California, September 1st and 2nd, the following officers were elected:

Thomas P. Hinman, President, 4th National Bank Bldg., Atlanta, Ga.

H. B. Tileston, First Vice-president, 916 Starks Bldg., Louisville, Ky.

Arthur M. Flood, Second Vice-president, 240 Stockton St., San Francisco, Calif.

Wm. A. Giffin, Third Vice-president, 609-610 Washington Arcade, Detroit, Mich.

Otto U. King, General Secretary, Huntington, Ind.

Arthur R. McLendy, Treasurer, Holston Nat'l Bank Bldg., Knoxville, Tenn.

The next meeting will be held in Louisville, Ky., July 25, 26, 27 and 28, 1916.

OTTO U. KING, Secretary.



Panama-Pacific Dental Congress.

The Panama-Pacific Dental Congress has passed into history, and in accordance with the opinion very generally expressed by those in attendance, the meeting was a decided success.

The Pacific Dental Congress Commission of 1915, the corporation now in charge of all matters relating to the Congress, and the publication of the transactions, desires to announce that a copy of the complete transactions, when published, and a copy of the official souvenir program will be sent to any one making application therefor to the Secretary of the Commission, Dr. Arthur M. Flood, 240 Stockton Street, San Francisco, California, and forwarding the fee of ten dollars.

Those subscribing for these extra copies of the transactions cannot be regarded as being members of the Congress, not having applied for membership before the meeting, or being in attendance at the same, but we believe these transactions will be a very valuable addition to the history of dentistry, and the souvenir program, containing as it does many items of historical interest and value, will be acceptable to any member of the profession.

PACIFIC DENTAL CONGRESS COMMISSION OF 1915.

ARTHUR M. FLOOD, D.D.S., Secretary.

Ohio State Dental Society.

The Ohio State Dental Society Semi-Centennial Meeting and Dedication of the American Miller Memorial, at Columbus, will be held December 7, 8, 9 and 10, 1915.

The program of papers, so far as completed, comprises:

Dr. E. C. Mills, President's address.

Dr. Herman Prinz, "On Causes Concerning Susceptability and Immunity to Dental Caries."

Dr. George H. Wilson, "Some Problems in Mounting Full Artificial Dentures."

Dr. Chas. C. Voelker, "Some Places for Silicate Cements in Dentistry."

Dr. Geo. E. Johnson, "How to Read X-Ray Films."

Dr. J. H. J. Upham, "Pyorrhea Alveolaris From a Medical View-point."

Fifteen-minute papers on practical subjects by:

Dr. W. O. Hulick, "Are Crowns and Bridges a Menace to Health?"

Dr. J. P. Benahan, "Conductive Anesthesia in the General Practice of Dentistry."

Dr. C. K. Teter, "Management of Difficult Extractions."

Dr. H. V. Cottrell, "Accessories to Articulation."

Dr. Gillette Hayden, "Differentiation Between Average Tooth cleaning and Prophylaxis."

Dr. L. E. Custer, subject to be announced.

Explanation of the Harrison Narcotic Law by the Deputy Collector of Internal Revenue.

Dr. Edw. C. Kirk will deliver the principal address at the dedication of the Miller Memorial statue on Wednesday afternoon, followed by Drs. T. P. Hinman, T. W. Brophy, N. S. Hoff, and others.

Thursday morning will be devoted to the presentation of a number of illustrated, descriptive clinics before the entire society, and Friday forenoon to a large number of general table and chair clinics.

On Wednesday evening a banquet will be served for our guests and members.

It is the expectation that this meeting will set a new high mark in State Society gatherings. Dr. Hinman, President, and Dr. King, General Secretary of the National Dental Association, will be present, and members from all State societies will be given a cordial welcome.

In view of the features of especial interest, we hope to have representatives from every State, inasmuch as nearly every State contributed to the expense of the Miller Memorial.

Please note the four-days' session and meet with us if possible.

F. R. CHAPMAN, Secretary.

305 Schultz Bldg., Columbus, Ohio.

Montana State Board of Dental Examiners.

The Montana State Board of Dental Examiners will hold a session for examination on January 10, 11, 12 and 13, 1916.

DR. G. A. CHEVIGNY, Secretary.

Butte, Montana.

North Carolina State Board of Dental Examiners.

The next meeting of the North Carolina State Board of Dental Examiners will be held at Salisbury, N. C., beginning promptly at 9:00 o'clock on Thursday, January 13, 1916. For further information and application blanks address the Secretary.

F. L. HUNT, Secretary.

Asheville, N. C.



Virginia State Dental Association.

The forty-sixth annual convention of the Virginia State Dental Association will be held in Richmond on November 7th, 8th and 9th.

The Jefferson Hotel will be headquarters.

This hotel is one of the handsomest, if not the handsomest in the South.

There is abundant room, just outside the Auditorium where the meetings will be held, for exhibits.

Exhibitors can communicate with Dr. R. C. Walden of Richmond, who is Chairman of Committee on Exhibits.

Dr. J. A. C. Hoggan of Richmond is Chairman of Entertainment Committee, and will gladly have accommodations reserved for guests.

GEO. F. KEESEE, Secretary.

200 E. Franklin St., Richmond, Va.

Pennsylvania Board of Dental Examiners.

The next regular meeting of the Pennsylvania Board of Dental Examiners, for the examination of applicants who desire to register in this State, will be held in Musical Fund Hall, Philadelphia, and the University of Pittsburgh, Pittsburgh, on Wednesday, Thursday, Friday and Saturday, December 15, 16, 17 and 18, 1915. Application blanks can be secured from the Department of Public Instruction, Harrisburg.

The Board desires to call attention to the resolution adopted recently by the Dental Council requiring that matriculates in a dental college in 1915 shall have the equivalent of a four years' high school diploma at the time of their matriculation, in order to be eligible for examination by the Pennsylvania Board.

The dental law passed by the last session of the Pennsylvania Legislature makes it necessary for every dentist engaged in the practice of dentistry in this State to register with the Secretary of the Board of Dental Examiners before January 1, 1916, and annually thereafter, at one dollar per year. Blanks are being prepared and will be sent as soon as possible. Anyone not receiving the blanks can secure them from the Secretary.

ALEXANDER H. REYNOLDS, Secretary.

4630 Chester Avenue, Philadelphia.

Texas State Board of Dental Examiners.

Next regular meeting of the Texas State Board of Dental Examiners will be held at the Adolphus Hotel, Dallas, Texas, beginning Monday morning at 9:00 o'clock, December 13, 1915.

All applications should be in the hands of the secretary, together with the fee of \$25.00, not later than December 8th. Official application blanks will be sent upon request. For further information address

C. M. McCUALEY, Secretary.

840 Wilson Bldg., Dallas, Texas.

Massachusetts Board of Dental Examiners.

There will be a meeting of the Massachusetts Board of Dental Examiners for the examination of candidates November 16th, 17th, 18th and 19th. Information and application blanks furnished upon application to the Secretary,

G. E. MITCHELL.

Haverhill, Mass.

Iowa State Board of Dental Examiners.

The next meeting of the Iowa State Board of Dental Examiners will be held at Iowa City, Iowa, commencing Monday morning at 9:00 o'clock, December 6, 1915.

For full information and application blanks apply to

DR. J. A. WEST, Secretary.

417 Utica Bldg., Des Moines, Ia.

The Dental Commissioners of Connecticut.

The Dental Commissioners of Connecticut hereby give notice that they will meet at Hartford, on November 18, 19, 20, 1915, to examine applicants for license to practice dentistry, and for the purpose of transacting any other business proper to come before them. Application blanks, etc., will be mailed by the Recorder upon request.

By order of the Commission,

EDWARD EBERLE, Recorder.

902 Main St., Hartford, Conn.



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Subscription, \$1.00 per year, in advance, to United States, Mexico, Cuba, Panama and other American territorial possessions. Canada, \$1.40. Other countries, \$1.75. Single copies of this issue, 15 cents (Domestic).

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Notification of change in address should be made on or before the 10th of the month, in order to have change made in time for the following month's issue.

Address all business communications to Consolidated Dental Mfg. Co., Publishers, Nos. 130, 132, 134 Washington Place; 187, 189, 191 West Fourth St., New York.

Communications for publication department should be addressed to the Editor, R. Ottolengui, M.D.S., D.D.S., LL.D., 80 West 40th St., New York.



Is Tartar a Cause of Pyorrhea Alveolaris? The Logical Test Applied.

By G. F. LOGAN, D.D.S., Philadelphia, Penn.

Considering the amount of space that pyorrhea is occupying in dental literature and proprietary advertisements, a discussion of its etiology, based upon "causation" as treated by logicians, should be acceptable.

This paper is not an attempt to solve the etiology of pyorrhea. Its main object will be to present an acid test which will eliminate some of our present fallacies and which will be applicable to future supposed solutions of our causal difficulties. After discussing the choice of name, it will show that the term pyorrhea is now used in a manner that precludes the possibility of our ever getting anywhere in searching for a cause.

It may enable the reader to follow the argument better if he will keep in mind the absolute necessity of a cause being invariable in its action; that causes are mere links in changes; the change that immediately precedes another change is the cause of the second change, and the second change immediately becomes the cause of the third change. It will also point out that there may be many elements in a cause but that tartar could not be one. It will illustrate the operation of the method by elim-

inating tartar as a possible cause or element in the cause of pyorrhea. It shows the use of a syllogism and summarizes rules that are used and which anybody can apply. It concludes by calling attention to the fact that if we acknowledge that pyorrhea can occur without tartar that it must be eliminated as the cause or an element in the cause.

I do not go into the difficulties that will be encountered in applying these tests to our search for the cause of pyorrhea. I am merely suggesting à test that should be valuable in trying out our hypotheses and thus preventing us from wasting energy on false premises.

When I started to write, I expected to make the viewpoint of this paper my introduction, but it has already expanded to such proportions that it is too long and sufficiently conclusive.

Before going into the main question it would seem advisable to devote a few paragraphs to a discussion of the nomenclature of the many-named condition usually referred to as pyorrhea.

**What's
in a
Name?**

"What's in a name?" is a familiar quotation. Sometimes, we can express in a name all the attributes of the thing denoted, at other times a name is a mere tag which does not possess any of the properties of the thing designated. Descriptive terminology is very desirable, but standardized definition is a necessity.

Names, like other words, are symbols by which we express our thoughts. We cannot express our thoughts unless we are able to transfer our exact concepts. So that when connotation is impossible, as in the case of the condition designated by the word pyorrhea, we must first carefully define the condition and then choose a word-symbol.

As Hobbes expresses it: "A name is a word taken at pleasure to serve as a mark, which may arouse in our mind a thought like to some thought which we had before, and which, being pronounced to others, may be to them a sign of what thought the speaker had before in his mind."

Then, the first requisite of a name is to designate an exact concept. Mental intercourse depends upon it and the degree of our comprehension is in direct ratio with the exactness of the transferred concepts. Definitions isolate concepts.

A man whose concepts are expressed in but one language, could not possibly carry on a discourse with a person speaking any other language. He might have a thorough knowledge of the meaning of every word he used and so might a person using words of any other language, but there could be no understanding between the two. We must agree upon the meanings of words and then use them in those meanings. As H. G.

Wells says: "Common words used in uncommon meanings sow a jungle of misunderstanding."

In my experience there is a jungle of misunderstanding as to the inflammatory or other transitory state at which pyorrhea begins. Too much effort has been given to descriptive nomenclature and not sufficient to defining the term used to symbolize the condition. In the advanced stages we would all agree but in the first, few of us, probably, would concur.

There are various kinds of definitions. They depend upon our viewpoint. Joyce gives seven. Among them are "descriptive" and "causal." The causal is desirable, but the descriptive is necessary. We cannot have a concept of such a condition as pyorrhea without it.

Jevons defines a definition as: ". . . . the briefest possible statement of such qualities as are sufficient to distinguish the class from all other classes and determine its position in the general classification of concepts." Do this and it does not matter whether the term by which we designate the pyorrheal condition spells, scurvey, false scurvey, stomacace, odontolithus, expulsive gingivitis, phogenic alveolaris, devastating process, infectious alveolaris, phagedenic pericementitis, ulceration of the pericementum, conjoined suppuration of the gums and alveoli, interstitial gingivitis, pyorrhea, or suppuration of the gums (as it was called by Bourdet about 1757).

The word pyorrhea is frequently used in dental literature as a general term. We speak of it as having constitutional and local causes. They are subdivided. Dr. Frederick Hecker, for instance, gives eleven different constitutional varieties. Therefore, we cannot refer any cause to pyorrhea (in medicine that term always refers to a specific) any more than we can say that disease or inflammation has a specific cause. The specific determines the form the disease shall take. Predisposed tissue will succumb to the first sufficient cause. If it be the bacillus typhosus, then the victim becomes a typhoidal patient; if it be bacillus diphtheriae, then a diphtheritic patient, etc. We can have inflammation from any form of irritation, whether it be chemical, contusive, or other abnormal condition. We say that pyorrhea is caused by the use of the rubberdam, by blows, by pressure of food, by bacteria, etc.

A cursory knowledge of causation convinces one that we must be more specific in our use of the term if we wish to refer any cause to pyorrhea. We need not seek a cause for pyorrhea used as a general term.

But pyorrhea is viewed by some as the product of a deposit, by others as being caused by specific bacteria.

I was particularly impressed, not long ago, while discussing the emetic treatment with a friend, of the necessity for a determining definition. He would not believe that conditions which I had cleared up were pyorrhreal. To his mind, emetic only is efficacious.

The successful use of drugs is largely dependent upon the ability of the user to define, to diagnose accurately. While treatment for diphtheria might be sufficient for a bad case of common sore throat, the treatment for ordinary sore throat would hardly suffice for a bad case of diphtheria. If the term diphtheria were so loosely applied as to cover all pathologic conditions of the throat, the percentage of efficiency of diphtheritic specifics would be greatly increased. So also would the number of the remedies and the haziness of the real symptoms.

Drugs deal with causes. Unless we know the cause of a trouble we cannot expect to administer drugs with any degree of uniform success. The variableness of success in administering drugs for pyorrhea is one proof of our ignorance of its cause.

No subject in dentistry has been more discussed than the cause of pyorrhea. Lessing says that if somebody had not wrangled we would not agree on any one subject. Discussion has undoubtedly cleared up many points in the pyorrhreal enigma but there are still many unsolved mysteries.

Discoveries are often obstructed by fallacies. Columbus's purpose was almost defeated by the superstition of his sailors, so that the elimination of fallacies is a step in the right direction. The means of eliminating some of the pyorrhreal fallacies is the major object of this paper.

In cogitating upon the cause of pyorrhea one of the things that troubled me was to determine just where a cause begins. A man falls from a roof. Was the elevation, gravity, the force of the push, the hand that pushed him, the mind that directed the hand, the angry words that anteceded the push, the mental state they produced, the nearness to the edge of the roof, or what, the cause? Where did it begin?

In casting around for a solution of my causal difficulty, I was led to logic. There I found principles used by men who have given us epoch-making discoveries. These principles should eliminate some of our pyorrhreal fallacies. The first one is the local-cause theory. The principles here applied to it can be used on others. Technically, tartar is never the cause of pyorrhea, nor can it be considered an element in the cause.

**Relation of
Logic to the
Science.**

As early as the thirteenth century Duns Scotus called logic the "Science of Sciences." Joyce says logic is: "The science which directs the operations in the search of truth." Jevons says it is about as rational to say that we can reason well without logic

as it would be to say that we can live healthily without medicine. Jevons points out that the word logic enters into the name of most of our sciences. They are nearly all "ologies." We have pathology, physiology, theology, etc., or the logic of disease, etc.

Of course, everybody uses logic consciously or unconsciously. The latter class lack the aid of logical formulæ. As logic is the "science of the laws of thought," its aid should be invoked always to test the validity of conclusions which are reached from obscure data. Up to a few years ago the custom of testing statements by reducing them to syllogisms and then analyzing these by logical tests was practiced in European universities.

To test anything one of the first requisites is an open mind. Descartes lays down the maxim that: "When we wish to arrive at the truth we must doubt everything we ever believed and especially those things about which we are most certain." This is not always an easy matter. Our beliefs too often stick like barnacles and impede our progress toward a solution and frequently even prevent our investigating matters about which we have very little proof, but about which we do have inflexible opinions.

One means of correcting our delusions is to refer them to some standard. The application of a foot-rule soon dispels the most positive linear optical illusions. But the standardization of the device must be established in our minds. Nobody can read books on logic without being satisfied with the methods which they expound. They are the methods of such men as Newton, Kepler, Faraday, Copernicus, Pasteur, etc. The tests used in this paper speak for themselves.

Nothing seems to be more unanimously and positively accepted by logicians and all other scientists than the "uniformity of nature." That is, that like produces like, as far as cause and effect is concerned.

Joyce interprets the inductive cannons "one and all" to be based upon "the same law, viz., that when of two facts the one can appear without determining the presence of the other, there is between these no causal relation." In another place he says:

"It follows that though we may say truly that the same cause must in like circumstances always produce the same effect, the necessity of this principle is hypothetical necessity. It supposes the First Cause to preserve the ordinary operation of the natural laws.....

"Thus the very concept of a natural agent devoid of free-will, involves that under the same circumstances its action will be of the same kind: and precisely similar considerations show that similar effects must be referred to causal agencies of the same kind. In other words Uniformity of Nature is an analytic judgment."

Prof. Hibben says:

"The whole tendency of modern logic is to base the causal postulate upon a ground which is epistemological; namely, inasmuch as our knowledge is one and self-consistent throughout all its separate elements, there must be a corresponding invariability in the phenomena themselves as there is in the system of knowledge which results from the interpretation of these phenomena."

Joyce further shows the invariability and reciprocity existing between cause and effect in the following statement and syllogism:

"We must not merely establish the proposition 'if M, then P,' but the reciprocal of it, 'if P, then M.' In other words they must be simply convertible. We are thus enabled to form the syllogism:

"P is M

S is P

∴ S is M

"In this way we demonstrate that the agent M is present in every S...."

Scientific causality began with the Greeks. One of the first objects of their speculation was the cause of the floods of the Nile and in recording that Herodotus showed a knowledge of the law of causality in rejecting the theory that they were caused by the North winds, as other rivers which flowed in the same direction did not have floods, and also because the floods occurred in the absence of North winds.

The early astronomers tried to reduce their proofs to rules. They sought uniformity. Tyco speaks of variation as one of the inequalities of the moon. Copernicus juggled his solar system until he arranged it so that no change could be made without disturbing the whole. He was after uniformity and when he found it, he concluded that he had solved the mystery.

Prof. Case in his "Scientific Method" says that Kepler arrived at his conclusion that the path of Mars is an ellipse by being able to construct a syllogism outlined as follows:

"Such and such positions are properties of an ellipse..

The orbit of the planet Mars has such and such a position.

Therefore, the orbit of the planet Mars is an ellipse."

Let us apply the syllogistic test to the local theory of pyorrhea.

The Test of Logic as to the Cause of Pyorrhea. No. 1. Pyorrhea is always caused by tartar. Mrs. Jones's teeth are coated with tartar. Therefore Mrs. Jones's teeth are pyorrhreal.

No. 2. Mrs. Jones's teeth are pyorrhreal. Pyorrhea is always caused by tartar. Therefore Mrs. Jones's teeth must be covered with tartar.*

*Syllogisms consist of three propositions.

There are four kinds of propositions: The universal affirmative, all X is Y; the universal negative, no X is Y; the particular affirmative, some X is Y, the particular negative, some X is not Y. The Universal are qualified by such adjectives as all, every, always, each, any, the whole, etc. They are general statements which admit of no exceptions. For instance, when I say "all pyorrhea" there is no room for exception. Causes are always universal. I have tried to emphasize this. Therefore, causes must be stated in a proposition by using one of the qualifying words I mention—all, etc. It is therefore necessary to say that, "Pyorrhea is *always* caused by tartar." There can be absolutely no exception. With an universal major premise, the conclusion of this syllogism could be only, "Therefore Mrs. Jones' teeth are pyorrheal."

The cause of phenomenon is often present without the phenomenon occurring because the conditions are not favorable. So that because pyorrhea is not present when there is tartar is not the test for its cause in all cases. That merely rejects "If N, then P" as a test. But we still have the "If P, then N" test which No. 2 illustrates. In other words, while the conditions or circumstances have prevented the cause from operating, if we have the effect at all we must necessarily have had the cause. Therefore, pyorrhea can never occur without tartar, if tartar be its cause. We all know that it does and as it does, tartar cannot be the cause of pyorrhea. In other words, if a five dollar bill were the only means of getting through the World-Series gates, then we know that everybody we see inside must have paid his five dollars.

There is no way for an effect to occur without its cause having preceded it. Its cause is always the same set of antecedent elements. The circumstances and conditions may change. (In medical causation, the predisposing cause might be considered the conditions and circumstances.) Therefore, unless we can construct a syllogism of a cause similar to both No. 1 and No. 2 that will not contradict our experiences and knowledge, we are testing what is only a supposed cause.

These syllogisms might be differently arranged and other words might be used, but the purport could not be changed one iota. Does it express our experience? If not the local hypothesis has failed to stand this test.

Riggs would argue that if tartar is not present it is because it has been dissolved away. That it was present long enough to initiate the trouble. Not many of us will agree with that. If we did, Dr. Riggs considered but one horn of the dilemma. He did not attempt to show why X is not followed by Y.

Somebody else argues that according to medical divisions of the sufficient cause, when you say tartar is the cause of pyorrhea you, of course, mean the exciting cause. When you refer to the cause of any disease

you always mean the antecedent of the specialized disease. The tissue area had been made ready for the initiating specific. But the definition of an antecedent constitutes an impossible obstacle to the acceptance of tartar as being a possible initiating agent. Antecedents are variable changes.

I cannot emphasize the "changes" too strongly. As Bergson would say, an antecedent is a "flow"; constant action, movement, transition, a constant becoming. The technical cause is necessarily the immediate antecedent. Let me illustrate by the links of a chain. Starting from one end the second link holds the first to the rest of the chain, the third the second, etc. Of course, they each contribute their quota to the integrity of the whole, but it would be very indefinite for our purpose to say that the twenty-third is the cause of the integrity of the whole. All things being equal, it is no more the cause than any other link. We can, however, speak definitely when we say that the second holds the first to the rest of the chain. The process of cause and effect is similar to that of making a chain. One link after another is made and joined onto the succeeding. It is a concatenation. In cause and effect we have a chain of antecedents and consequents. As soon as the consequent is attached to its antecedent, it becomes the antecedent of the next link or consequent. So that every effect becomes the cause of the next effect-link. Unless we adhere to this form of reasoning, we cannot point definitely to any cause. We spread out our cause so that there is no point to it. We have the problem of the cause of the man falling from the roof.

Now, then, let us apply this test to tartar as the consequent of pyorrhea. Is there anything in the nature of tartar that would suggest it as being the antecedent? Is it likely to change from day to day? If it does not change then it cannot be an antecedent. It is simply a condition. Joyce gives this definition of a condition: "That which in one way or another enables the causes to act in the production of the effect, but which does not make the thing what it is." Joyce makes the striking of a match a condition and proves it by showing that the match could be ignited by heat, percussion, chemicals, etc. Such a condition is a determining cause. Unfortunately tartar lacks action. There is no analogy between a deposit of tartar and the striking of a match. Tartar is practically a constant; a cause is always a variable. There is an analogy between tartar being one of the supposed causes and the striking of a match being one of the means of igniting it.

Let us compare it to infectious diseases. Whatever their antecedent there is always action. The exciting cause is the poisons introduced by bacteria. Action again. When we say that a person died from diphtheria

we do not name bacteria as the cause but the disease produced by them Diphtheria is not a germ but the consequent of germ products.

This reasoning is not so clear when we come to benign growths. Still, there is action here to. There is a constant sapping of the vitality by the growth. Growths that are fatal are active. They expand.

Take the case of concretions such as gallstones. They become the cause of trouble when they lodge in a passage. They are then active.

The gradual increase in size of gallstones may enable them to obstruct a passage and the gradual increment of a deposit increases the area of its impingement, but experience has demonstrated that there is not a corresponding increase of even inflammation, in some cases. The change, when tartar seems to be a factor, is in the vitality of the tissue. It may help the cause to act. It is then an element in the condition, not an element of the cause. It does not meet the quantitative test to be given later.

A circulating embolus may cause little trouble. Let it lodge in the bifurcation of a brain artery and it becomes very active.

Relation of Tartar to Adjacent Tissues. Does tartar acts as do tumors by impinging upon contiguous tissue? Let us see whether it does? Sanguinary tartar is deposited below the gum margin. Let us select also a given position for a benign tumor. Say in the throat near the trachea. Every unit of addition to the tumor increases in direct ratio the distress from the extra impingement. Does that occur in the case of tartar? Is the degree of pyorrheal trouble proportionate to the increment of tartar? As a matter of fact experience clearly demonstrates that it has nothing to do with the degree of pyorrheal trouble. We may even have one without the other. Could this possibly occur in the case of the tumor? Manifestly not. Then there is no analogy.

I repeat that relatively tartar is a constant. If it has any part in the cause of pyorrhea it is operative only during a great depression in the vitality of the tissues. In this case the variable is the vitality of the tissue and tartar a condition. Not a determining cause condition, however. Consider the rapid changes that take place in tissues. Fear may blanch the lips. Cold causes a bluishness, etc. The antecedent might easily be the change in vitality, but tartar cannot be considered as even an element. The X that causes Y may have many elements in it but they are all variables. Constants are conditions. Scientific tests are always directed to eliminate circumstances that do not participate invariably. As soon as it is found that Y can be produced without a certain circumstance being included in X, then that circumstance is eliminated. It is not an element in the cause X.

The thoroughness of these tests are suggested by the following summary of those used in the inductive method which is the method employed in medical causation:

(1) Method of Agreement: When the cases under investigation are *invariably* preceded by a common circumstance, that circumstance is probably the sufficient reason for the phenomena.

(2) Method of Difference: If in two cases, in one a phenomenon occurs and in the other it does not, then eliminate all the circumstances that are common to both. Investigate by further tests the circumstances that were present when the phenomenon did occur. This is a negative test.

(3) Method of Residues: If we determine a b c is caused by A B C and then that A causes a, B causes b, it follows that C is the cause of c.

(4) Method of Concomitant Variation: This is a quantitative test and used when the antecedent cannot be isolated. When an increase of the units of the antecedent produce a correspondently increased variation in the consequent then it is concluded that there is probably a causal relation between the antecedent and the consequent.

Weldon expresses No. 4 in the following formula: "A₁ B C—a₁ b c; A₂ B C—a₂ b c; A₃ B C—a₃ b c: whence we conclude that A is causally related to a."

Mercier adds a fifth: The Composite Method or "the cumulative employment of all the preceding."

Experientially, the local theory as to the cause of pyorrhea would not stand one of these tests to the elaboration of which Hibben devotes fifty-five pages.

If we concede that pyorrhea is ever possible without the presence of tartar, then according to the "Science of the laws of thought"; "... the science which directs the operations of the mind in the attainment of truth"; "...the systematic order to be observed in judging, reasoning, and other processes of thought in order to arrive at the knowledge of truth"; "The science of sciences," tartar is never the cause or even an element in the cause of pyorrhea. Anybody who makes such a claim simply ignores the basic principles of "causation." Their contention will not survive one test.

JUST A NOTE:—A great deal of importance has been attached to the response of pyorrhea to prophylactic treatment. There is no record of periosteum attaching itself to tartar, or of wounds surrounded by necrosed or tissue of low vitality, healing while full of dirt. What does that prove?



In the last three years my pyorrheal patients have had almost uniform success in treating their own cases. I have chosen people whom I knew were in earnest and would follow my instructions.

After an operator has thoroughly removed all deposits it is not what he does two or three times a week, but what his patient does three times a day that counts. Imagine a surgeon syringing out an old wound, making it aseptic for a few hours, and then turning his patient loose with the inflamed and low-vitality tissue unprotected against irritant and infectious substances for two or three days. Well?

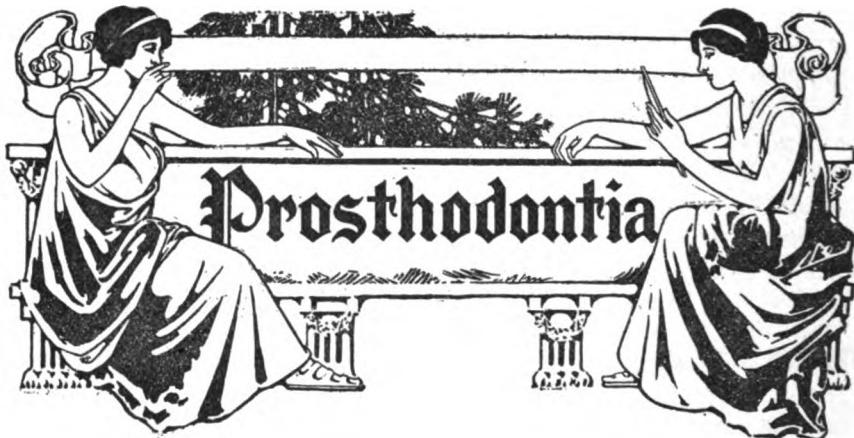
Note on Staining Amoeba in Dry Smears, from Cases of Pyorrhea.

By THOMAS LE CLEAR.
Laboratory of Fraser & Co., New York City.

In the June issue of ITEMS OF INTEREST I described a method of preparing and staining dry smears for the detection of amoebæ. In the directions it was stated that the smears should be "fixed" by passing quickly through the flame of a Bunsen burner five or six times before staining. In the course of making a large number of such preparations, it was accidentally discovered that the smears could be stained without "fixing" and that very much better results are obtained when the "fixing" is omitted. Preparations are now stained without previous fixing as a routine in our laboratory, and the improvement in results is very marked, not only in the staining of the amoebæ, but in the staining of pus cells and the bacteria which take up the red stain.

By this modification (staining without previous fixing) the structure of the amoebæ is brought out to a remarkable degree and the inclusions, particularly those staining red, are very distinct. In some cases the amoebæ show partially extended pseudopodia, and the picture is so distinct that it is practically impossible to confuse amoebæ so stained with other cellular elements which might be present in such material.

Repeated trials have shown that it is not necessary to "fix" such material in order to make it adhere to the slide before staining, and that by omitting the heat decidedly better results are obtained. The heat apparently distorts some of the cellular elements and produces changes in these elements, whereby they do not take up the stains as readily.



"The Application of the Chayes Parallelometer, the Parallelodrill and Attachments in the Conservation of the Reciprocal Functions of the Teeth Which are Used as Piers for Bridgework."

By HERMAN E. S. CHAYES, D.D.S., New York.

The writer is receptive because while writing he attempts to discern the mental approach leading most directly to his reader's mind, and tries to so deliver or record what he conceives as truth, that it will as nearly as possible be in harmony with the reader's mental processes.

So that in a reflex sort of a way, the writer is really the reader, or the writer's reflector, his spokesman, his instrument, often voicing or giving crystallized form to innumerable thoughts emanating from the reader's mind.

It may then be hopefully assumed that in their essence, these articles voice what the profession at large feel or know to be true about this subject: that they have known these things to be true for ever so long, and that the writer is fortunate enough to be the favored one, actually influenced by the cumulative thought power of his confrères to the extent of caligraphically recording in concrete form, what has so long existed in the abstract or nebulous feeling.

This is a continuation of an article dealing with the specialized field of dentistry; with that part of dentistry which has to do with the restoration or replacement of lost teeth by means of bridgework.

Permit me here to make reference to the definition and classification of bridgework published in the *ITEMS OF INTEREST*, June, 1915, page 418 to 419. Also to that part of page 421 which follows the subtitle,

"Mobility of Natural Teeth," and since all of us are seeking the true solution of bridgework difficulties, and since I believe that such solution is partly contained in the article here referred to, and since I think that more of this true solution will be found in this present article, and in those which are to follow, I take the liberty of requesting that the article in the June number of the ITEMS OF INTEREST be carefully read over again, before we go any further in the perusal of this, the present one.

This will do some things for us; it will refresh our mind in regard to the general principles of this work; it will serve to check up any inaccuracies which may have a tendency to creep in, when one's hand, under the influence of mental activity, wields the pen too rapidly. Also it will save the otherwise necessary reiteration of the principles referred to.

A finished or refined medical effort, in behalf of any organ, implies a knowledge of its individual and relative anatomy or physical relationship and a comprehensive understanding of the physiological functions of that organ.

This brings us up to the affirmation that teeth have functions (plural used advisedly) and a careful enumeration and a critical classification of these functions are now in order.

We may now record the truth that the so-called masticatory apparatus is not a separate distinct and independent part of the human organism, but a functioning multiple member, or cog, of a very complex microcosm in the maintenance and preservation of which it plays a very important part.

This truth also: The so-called masticatory apparatus is not a simple functioning member of this complex machine, but is in itself, a very complex component, in that it comprises many organs diversely endowed with specialization.

The thing that suggests itself first to my mind in regard to tooth function, is the reciprocal functions of the teeth, reciprocal because they do something for the organism which does something for them.

Since every organ of the body passively and actively exercises such functions, these may be called the "reciprocal functions," and must be classified as the "passive" and "active reciprocal functions" of the special organs.

Passive Reciprocal Functions.

The passive reciprocal functions of the teeth are defensive, cosmetic, developmental and phonetic. (See diagram.)

RECIPROCAL FUNCTIONS OF THE TEETH

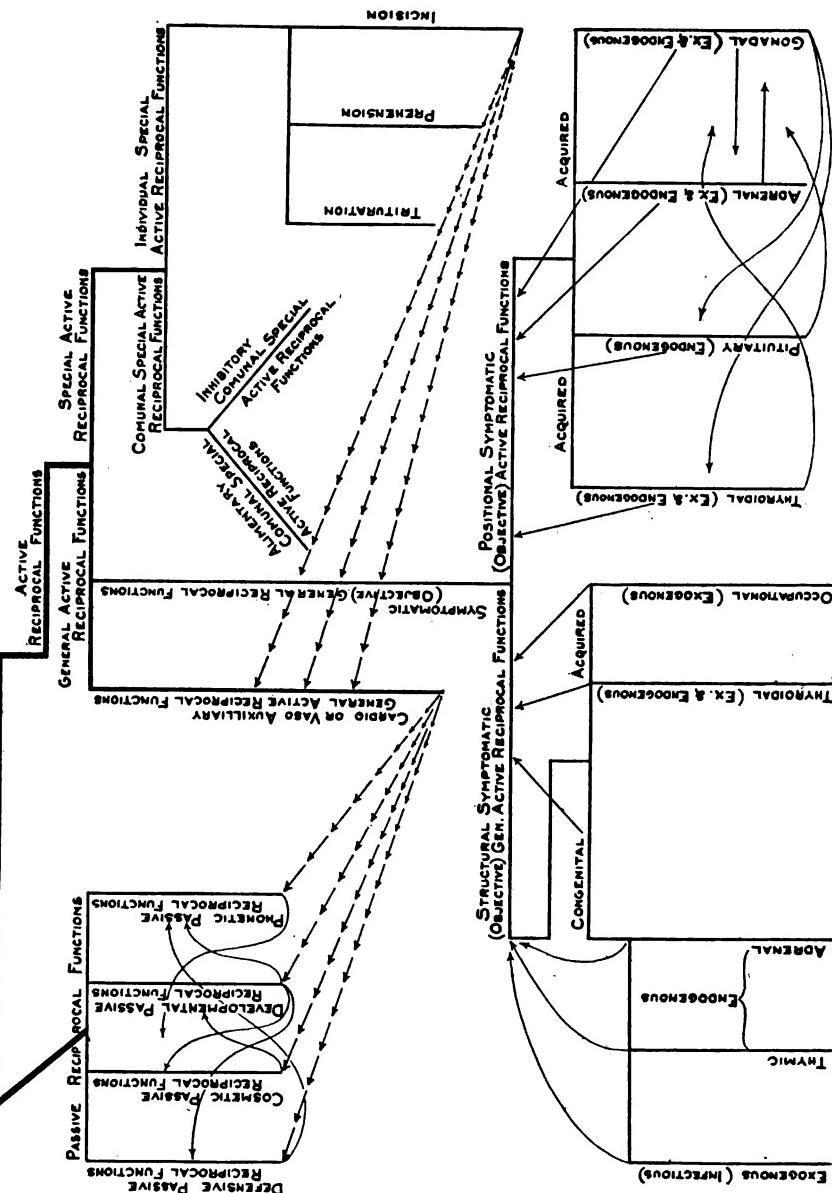


DIAGRAM SHOWING RECIPROCAL FUNCTIONS OF TEETH



Defensive.

The Defensive depend upon the gross anatomy of the teeth, that is, they are so shaped as to prevent injury to the soft tissues surrounding and supporting them.

Cosmetic.

The Cosmetic depend upon the gross anatomy, geometric harmony and the bio-chemistry of the teeth. They must be in harmony with other features of the face and by correct growth, influence the other features of the face to harmony, thus also partly exercising the developmental function.

Phonetic.

The Phonetic depends upon the gross and microscopic anatomy of the teeth and their position relative to each other. That is, they must not only be of a shape and relation conducive to clear enunciation, but also of a texture insuring the proper degree of resonance or vibration. The latter part of this function we can unfortunately not restore by artificial means.

Active Reciprocal Functions.

The Active Reciprocal Functions of the teeth must be further classified into general and special.

General Reciprocal Functions.

The General are cardio- or vaso-auxiliary and symptomatic.

The cardio- or vaso-auxiliary functions consists in the restimulating effect, which the mobility of the teeth has upon the circulation of the structures in which they are, and with which they are resiliently joined.

By virtue of this mobility, they induce a rhythmic intermittent pressure which, inimical to end tissue stasis, brings about a constant change of the nutrient elements traversing the nutrient channels of these tissues.

The Symptomatic must be subdivided into structural and positional.

The Structural Symptomatic may be indicative of some congenital or acquired constitutional anomaly such as (Hutchinson's teeth), thyroidal disbalance (as illustrated in teeth easily attacked by caries), or in the presence of a marked procreative urge, often bordering on lack of sexual equilibrium, as illustrated in cuspids of decided prominence and marked prehensile formation reflecting perhaps the animalistic trend of the individual in whom very frequently are also to be found small suprarenal bodies with narrow cortex, demonstrating perhaps a greater procreative and a lesser intellectual mission in the Cosmic scheme.

The Positional Symptomatic deal with the mal-position of different teeth in the maxillæ and mandible and are valuable diagnostic determin-

ators in that they thus unerringly point to pituitary, gonodial, thyroidal and adrenal disturbances which would otherwise be most obscure.

**Special
Reciprocal
Functions.**

The Special Active Reciprocal Functions of the teeth are communal and individual.

The Communal special reciprocal functions of the teeth are alimentary and inhibitory.

The Alimentary consist in the part they all play in the preparation of certain foods for the process of digestion.

The Inhibitory consist in the physical relationship of the teeth or their relative apposition mesio-distally in particular, so as to retard, or limit, the latero-rotatory motion they acquire when in use.

The Individual are those of incision, prehension, mastication and trituration, and in the sequence enumerated, involve the incisors, cuspids, bicuspids and molars.

And since all functions are reciprocal, there can be no fixed rule or line of demarcation as to where one stops and the other begins.

All these enumerated, classified and dissected, present themselves vividly at some point, the height of the particular functional expression, to gracefully and gradually merge or lose themselves in those which follow.

Thus we have an interplay of parts devoid of harsh or interruptive demarcations. A pleasing harmony as expressed in co-ordinate effort, salubrious in effect; a song of work as marvelously planned as it is symphonically expressed in livingness, and yet more livingness to the glory of the mind that bade it come into being.

**Variations
and Effects of
Stress in Mastication.**

Incision, prehension, mastication or trituration are resultants of opposing forces as expressed in occlusal stresses of upper and lower teeth, or rather of lower against upper teeth.

The direction in which these stresses are exercised vary in these functions so that it must be definitely understood, that the stress which actuates the anterior teeth to incision, is not the same as the one which actuates the cuspids to prehension, and not the same which actuates the bicuspids in their prehensio-triturating function, and that the stress which actuates the molars to trituration is not the same as the one which actuates the other teeth to their particular functions, not the same either in intensity or direction.

**Incisal
Stress.**

The stress which resolves itself in incision is exercised in an upward, outward and backward direction, against the upper incisors and results in an opposing stress downward, inward and forward

against the lower incisors, or gingivally and labio-distally in the upper incisors and gingivally and linguo-mesially in the lower incisors.

Cuspid Stress. Upper cusps are called upon to withstand a stress slightly upward, markedly outward and equally forward and backward, that is, gingivally and labio-mesio-distally.

This is balanced by the suspension ligament, the lips, the tongue, and the adjoining teeth.

The lower cusps resist a pressure downward, inward, forward and backward; that is gingivally and linguo-mesio-distally.

This is balanced by the suspension ligament, the tongue and the adjoining teeth.

Bicuspid Stress. The upper bicuspids yield to a stress in an intra-alveolar, labio-distal and linguo-mesial, in an upward, outward and backward, and in an inward and forward direction, balanced by the suspension ligament, the cheeks, the tongue and the adjoining teeth.

The lower bicuspids incur a stress markedly downward and inward, to a less degree down and backward and in a down and forward direction, or mainly gingivally and lingually intra-alveolar and to a less degree intra-distally and intra-mesially.

Molar Stress. The upper molars yield to a stress in an upward, outward, backward, inward and forward direction (outward and backward predominating) or in an intra-alveolar, bucco-distal, bucco-mesial and palato distal direction, (bucco-distal predominating.) Here we see what may be considered a rotary yield to stress or what is more, an almost spheroidal yield in the exercise of function, balanced by the suspension ligament, the cheeks, the fibres of the buccinator muscles, the tongue, the adjoining teeth and in the last upper molar by the tuberosity.

The lower molars yield to a functional stress in the following direction. Markedly gingivally, markedly intra-bucco-distally and intra-linguo-mesially; and in a less degree intra-disto-lingually and mesio-buccally, or markedly downward, marked down and backward, down in and forward, and in a less degree down back and inward and down forward and outward.

All the foregoing data regarding stress exercised upon teeth in function are for teeth in nearly normal occlusion and with any marked deviation from the normal must come a study of the individual case and the stresses which the teeth may be subjected to when in use.

**Study
Models.**

For the reason that cases requiring restorations known as bridgework rarely if ever present in normal occlusion, study models are absolutely essential to the man who undertakes the case. The architect who expects to build a shack, a bungalow, a cottage or a skyscraper has his plans to follow, all figured out to the minutest detail. The engineer who undertakes to build a railroad bed or a bridge knows to a bolt for every fishplate or to a rivet in every joint just what he is to do. An unforeseen emergency arising, he is better prepared to meet it properly and successfully if he had studied his plans than he would be if he were doing his work in a haphazard empiricism. A bricklayer has his line to follow; a mason his straight-edge; a die-maker and his depth-gauge are inseparable; a machinist and his blueprints or patterns are spoken of as one.

Study models should be the synonym for dentists, and those study models should be made from plaster impressions carefully taken. The casts or models should be carefully made of the hardest workable plastic substance obtainable, and these models should come in for a large share of the dentist's attention.

Each tooth should be carefully examined in the mouth and as carefully on the model. These models must be studied separately and in their relation to one another.

If but one tooth be missing and a restoration is to be undertaken, the care exercised in the examination of the model should be as equally thorough as if any number of teeth were involved.

**Involvement of Natural
Teeth in Bridge work.** If the second lower molar has been lost and a restoration is contemplated, the first and third molars will be involved in the construction and the upper second bicuspid as well as the three upper molars will be involved in occlusion.

The replacement of the first lower molar involves the second molar and second bicuspid in construction and the two upper bicuspids and first and second upper molars in occlusion.

The replacement of the second lower bicuspid involves the first lower bicuspid and first molar in construction and the upper cuspid, bicuspids and first molar in occlusion.

The replacement of the first lower bicuspid involves the lower cuspid and second bicuspid in construction, the upper lateral, cuspid and two bicuspids in occlusion.

The replacement of the lower cuspid involves the lower lateral and first and second bicuspid in construction and the upper central, lateral, cuspid and two bicuspids in occlusion.

The replacement of the lower lateral involves the lower central and



cuspids in construction and the upper central, lateral and cuspid in occlusion.

The replacement of the lower central involves the opposite lower central and the lateral adjoining the edentulous space in construction, and the two upper centrals and the lateral opposite the edentulous space in occlusion.

The replacement of the two lower centrals will involve the two lower laterals and cuspids in construction and the six anterior uppers in occlusion.

The replacement of the four lower incisors will involve the lower cuspids and first bicuspids and alveolar ridge in the construction and eight anterior upper teeth in occlusion.

The replacement of two lower bicuspids and first lower molar will involve the lower cuspid, second molar and alveolar ridges in construction and the upper lateral, cuspid, and two bicuspids, first and second molar in occlusion.

The replacement of two lower molars upon one side of the mouth, will involve either the lower cuspid and two bicuspids and alveolar ridge in construction and all upper teeth distally to the central on that side in occlusion, or may involve the second bicuspid and cuspid and alveolar ridge upon the edentulous side of the lower and the second molar upon the opposite side of the lower in construction and all the teeth distally to the upper central on one side and the three molars upon the other side of the upper in occlusion.

The replacement of the upper second molar will involve the first and third molars and palatine surface between them in construction, and the three lower molars on that side in occlusion.

The replacement of the upper first molar will involve the upper second bicuspid and second molar and the palatine surface between them in construction and the second lower bicuspid, first and second lower molar in occlusion.

The replacement of the upper second bicuspid will involve the first bicuspid and first molar in construction and the two lower bicuspids and first lower molar in occlusion.

The replacement of the upper first bicuspid will involve the upper cuspid and second bicuspid in construction and the lower cuspid, two bicuspids and first molar in occlusion.

The replacement of the upper cuspid will involve the lateral, first and second bicuspid in construction, and the lower lateral, cuspid, two bicuspids and first molar in occlusion.

The replacement of the upper lateral involves the upper central

and cuspid in construction and the lower central, lateral, cuspid and first bicuspid in occlusion.

The replacement of the upper central involves the other central and lateral adjacent to the edentulous space and the cuspid on that side in construction and the lower central, lateral, cuspid and first bicuspid in occlusion.

The replacement of the upper centrals involves the upper laterals and cuspids in construction and the eight anterior lower teeth in occlusion.

The replacement of the four upper incisors involves the upper cuspids and first bicuspids and the antero-palatine surface of the intermediate alveolar ridge in construction and the eight anterior lower teeth in occlusion.

The replacement of the upper two bicuspids and first molar involves the cuspid, second molar and the palatine surface of the intermediate alveolar ridge in construction and the lower teeth of that side distal to the lateral in occlusion.

The replacement of an upper central and lateral incisor will involve the central, lateral, and cuspid adjacent to the edentulous space in construction and the four lower incisors as well as the cuspid and first bicuspid on one side in occlusion.

The replacement of the upper molars on one side of the arch will involve the second and first bicuspid on that side and the first molar on the opposite side as well as the alveolar ridge including tuberosity on the edentulous side in construction, and all lower teeth distal to the cuspid on the side and the first and second molar on the opposite side in occlusion.

The replacement of the upper molars on both sides will involve the second bicuspids, cuspids and alveolar ridge, including the tuberosity, also the palate in construction, and all lower teeth distal to the four incisors in occlusion.

**Classification
of Bridges.**

A bridge which involves one side of the mouth is a unilateral simple, or a unilateral compound bridge.

A bridge which involves both sides of the mouth is a bi-lateral complex bridge; and it must be remembered that the teeth which are directly concerned in the construction or occlusion of a bridge, indirectly influence all the other teeth in the mouth to a more or less limited degree, either favorably when the work has been properly executed, or unfavorably when the restoration is faulty.

An artificial restoration such as a piece of bridgework, can never be modified, or in any way influenced by its environment, but on the contrary it may exercise a powerful influence upon any environment in which it may be placed.



This influence may be a positive physiologic one or a positive pathologic one and it may be partly passive and partly active.

If the restoration has been constructed in full accord with all the requirements as enumerated and minutely set forth in the previous article and in the beginning of this, its influence upon its environment will be constructive, physiologic and restimulating.

If in the construction of the appliance some or all of the requirements have been ignored, its influence upon its environment will be patho-morphologic or destructive.

Without at this time going more deeply into the philosophy of the problem, it will suffice to record for future elucidation that these influences upon environment are active and passive; that is, we have active constructive and active destructive influences, and we have also passive constructive and passive destructive influences.

We must recall that bridgework has been defined, divided and classified into simple, compound, complex and cantilever, and it should not be difficult to convince ourselves of the truth of the following statements:

Of all bridges, a simple one may be most easily made conducive to the health of the patient.

A compound bridge presents greater difficulties in construction than a simple one, and yet both may be so made that their influence upon the patient's health will be wholly physiologic and restimulating.

A complex bridge presents greater difficulties in construction than a compound one, and yet it may be so made that it will be conducive to the health of the patient from every point of view.

A cantilever bridge presents by far the greatest difficulties in construction and never can be so made that its environmental influence shall be wholly physiologic.

This comes from the difficulty of limiting the vertical yield of the distal part of such bridges under stress and our inability to halt or arrest this stress before the elastic limit of the subjacent mucosa has been reached.

It is for this reason that the bugbear of resorption becomes a vexing factor in these types of restoration, and while it cannot be entirely obviated it may be limited to a great extent by painstaking attention to occlusion.

The artificial teeth in these bridges must present occlusal surfaces which are exceedingly well defined and capable of dismemberment of food with the least expenditure of muscular effort and hence with but little saddle pressure upon the underlying mucosa. More of this at some future time.



Items of Interest

If we now recall the definition of a simple bridge, we can readily see why it would be the least difficult one to so construct, that it would be wholly conducive to the health of the patient and the realization is inevitably brought home to us by the process of association of ideas that it would be desirable if there were no others, that is, if all were simple bridges.

Next to having no need for bridges at all, it would be ideal if we never had any but simple bridges to construct, and since we have bridges, we may as well exclude the first condition for the present and accept for our ideal that bridge in which the abutments and the artificial substitute are subjected to a stress in the same or very similar direction during the exercise of function.

Forthwith we realize that this is an ideal not possible to reach in a great many cases, particularly the extensive ones, and in seeking to approach our ideal as nearly as we may, we do the next best thing; we compromise by making the compound, complex and cantilever bridge as simple as we can by the method of segregation.

In these instances it simply means the breaking or interrupting of transmission of stress, by providing limited mobility at definite points and in definite directions, the mobility provided being as intermittent as the stress of mastication.

Let us now go on to the consideration of a bridge restoration, known as a simple bridge. (To be continued).





Some Principles of Retention.

By MARTIN DEWEY, M.D., D.D.S., Kansas City, Mo.
Read before the American Society of Orthodontists at Toronto.

Some few weeks ago I wrote a paper on this subject and mailed it to the men who would discuss my paper, but since arriving at Toronto and listening to the discussion and the reading of other papers, I have decided to cut out about half of my talk and deal only with one phase of retention.

Fundamental Principle of Retention.

Retention may be defined as "the application of force to maintain teeth in the proper position in the line of occlusion." At first glance, this definition may be considered contrary to everything we have been taught in the past in regard to retention.

I can remember when it was the common opinion among orthodontists that retention consisted in holding the teeth rigid in the line of occlusion until such a time as they might become firm. At the present time it is the application of force to maintain the teeth in the proper position with the line of occlusion, and we may say that this application of force is derived from two sources. These sources are mechanical and natural.

Mechanical Force in Retention.

Mechanical forces of retention are "such forces as are exerted by mechanical devices. These mechanical devices are divided into active and passive. The passive mechanical retention is the first form of retention that we knew anything about, and is that form which was employed when teeth were held rigid. It is based upon the opinion that in order that a tooth might become firm it must be held rigid. After at-

tempting that plan of retention for a number of years it was found that the longer a tooth was held rigid the longer it remained loose. That is, the tissue which should support the tooth will not develop if the tooth is held absolutely rigid by a mechanical device. It has long been a law in the retention of the teeth to antagonize them in the backward direction only. Now, the important factor is the application of some mechanical device which will antagonize this backward tendency. Several years ago Dr. Watson presented a paper before the American Society of Orthodontists on "Retention," in which he outlined conditions as they existed at that time, and made the statement that orthodontists were confronted with the problem that they could move teeth, but they could not hold them. In other words, the regulating appliance had advanced farther than the retaining appliance.

About that time Dr. Watson and several others advocated the use of the intermaxillary rubber for the retention of Class 2 cases, and that was the beginning of active retention. So at the present time

Active Force in Retention. active retention, or an active retaining appliance, is one which exerts a force to overcome the backward tendency of the tooth. This force is exerted by having some sort of appliance which is active. This may be a spring from a lingual arch, or it may be a pull from an intermaxillary rubber, and whichever method it is, is the reverse to the methods, or ideas held in times past. However, active mechanical retention is far superior to passive mechanical retention, because it has been proven that in order for a part to develop it must be used. The gradual stimulating influence which is exerted upon a tooth by an active mechanical device causes the part to develop much more rapidly than it would if no such force were exerted. In other words, the use of an active retaining device stimulates the natural forces of retention, which is the same as the natural forces of occlusion. We have all recognized for a great many years the importance of the force of the inclined plane as a factor in retention and as a force in occlusion, but it is only one small part of the story.

Force of Approximal Contact. Associated with the force of the inclined plane is the force of approximal contact, which is the force exerted between the teeth of one arch upon the approximating teeth of the same arch. The force of

the approximal contact is only a small point, and the teeth must be carefully placed so that this approximal contact will be normal. It is possible to have a normal locking of the inclined plane and still have an abnormal approximal contact. This has occurred in the Class 2 cases, where the lower teeth have been tipped excessively. We

had a normal mesio-distal relation of the cusps, at least probably not a normal occlusal relation, but the approximal contacts were abnormal because they did not occupy the proper relation to each other. Another example may be found in the lower cuspids, or any of the lower anterior teeth, which may have a proper occlusal inclined plane relation, but the approximal contact may not be exactly right, and one of the other teeth will slip out of the line of the arch.

Force of Muscular Pressure. Another force which holds the teeth in the proper position is muscular pressure, understood by all of us. Now, muscular pressure, or muscles of the lips and cheeks and the tongue, not only hold the teeth in their proper positions, but those muscles must act normally in order that the bone may develop properly around those teeth. There must be not only a normal action of the muscles of respiration and muscles of mastication, but everything concerning the mandible and the maxillæ in the way of a muscular action must be normal. Not only must the lips be held in contact during the entire time, but the muscles of respiration, or those muscles which depress the mandible, must also be normal, and the action of the tongue must be normal in order to maintain the width of the upper and lower arch.

Atmospheric Pressure. Atmospheric pressure is another factor which has to do with retention, and which necessarily is closely associated with muscular activity. There has been so much said about harmony in the size of the arches as a force of occlusion that it hardly need be mentioned as a force in retention.

Cell Metabolism. Now, the last force of retention to be considered is cell metabolism, which, to a certain extent, depends upon all the other forces which I have mentioned, and which is responsible for the success of the case. We may have all the other factors absolutely normal, or as near normal as we can get them, but if cell metabolism does not respond as it should, the case will be a failure. Dr. Noyes has said that the permanent retaining device consists of spiculæ of bone and fibres of the periodental member. They are the result of cell metabolism, and cell metabolism is the result of all these other forces.

Bone Development in Retention. There has been a great deal said, recently, in regard to the development of bone as a factor in retention, or in regard to the development of bone as being responsible for the permanent position of the teeth. There is no doubt but that there are various means of causing and stimulating growth of bone around the teeth,

but it must be remembered that if the growth of the bone is the result of the regulating appliance, or the retaining appliance, that it will be absolutely useless so far as retaining is concerned. It has been shown in the movement of the teeth that spiculae of bone will develop and respond to mechanical stimulation. Therefore, it becomes necessary that if the bone is developed as the result of the regulating appliance, those spiculae of bone must be made to develop in exactly the same manner as they would develop as the result of the forces of mastication and use. You may adjust a very beautiful appliance, move your teeth bodily, move the apices of the teeth and get a development of bone, which development will be true bone so far as the histological structure is concerned. But the spiculae of bone must not be arranged to withstand the stress of mastication, but rather to withstand the stress of the regulating appliance, and as a result of the stress of the regulating appliance. A similar retaining appliance may be put on, which will continue to develop that bone, but as soon as the appliance is removed, and the teeth receive the stress of mastication, which is a different stress from the one we had from the appliance, the bone, which had been developed, will be absorbed again.

**Opening the
Suture.**

In the experiments which I have been carrying on with dogs in relation to opening the intermaxillary suture, I have progressed so far with some of them that I have opened the suture and shown, by radiographs, that the space is filled with bone. I say this is bone because in those we have killed and examined, we have found that the tissue is bone. I have removed the regulating appliance, and the teeth have immediately returned to their old positions as the result of the absorption of the tissue which had been built into the intermaxillary suture, and this absorption has occurred as a result of the stresses of mastication, being different from the stress of the retaining appliance, or the regulating appliance. I believe if those teeth had been held apart for years, when the appliance was removed, the return to the old position would have been just as rapid, because the bone was developed as the result of unnatural force. Also, the force of muscular pressure and force of the inclined plane was abnormal, which, of course, would cause the bone to be absorbed.

In closing, I will say that the solution of retention lies in the construction of a mechanical device, which will allow the teeth to respond to all of the stress of mastication. The teeth must be held loosely and so as to antagonize the back direction, which can be done by some form of appliance which will allow them to move, as the result of the stress of mastication. Furthermore, the solution of retention does not lie in the

stress of bone development, but lies in obtaining a normal action of all the forces of occlusion, and this normal action can only be obtained by the use of appliances that will not interfere with mastication. Also, that permanency in retention depends upon the normal action of natural forces of retention, and the sooner we become familiar with the natural forces of retention and with what these forces will do, the sooner will we have permanent results, and not be compelled to see our cases relapse, as we have in times past.

Discussion of Dr. Dewey's Paper.

I am rather at a disadvantage in discussing Dr. **Lloyd S. Courier,** Dewey's paper, because his lecture has been materially different from the written paper which he furnished me.

There are one or two points I noted while he was speaking that I want to refer to and one is this: He says it is impossible to retain the teeth if cell metabolism is faulty or if we have insufficient tissue development. That might account for one of the difficulties many of us have had in connection with retention. We make a mistake in undertaking treatment when it is practically a physical impossibility because of being hampered with faulty cell metabolism and insufficiency of tissue to accommodate the changes we wish to make, and for the same reason I would take issue with the statement that there is no question about getting bone development where we wish it. Dr. Dewey may be able to do that, and if he is able to do it, I would like him to give us a carefully prepared paper explaining just how he can get bone development where and when he wishes and to any extent he desires, because I cannot accomplish what I wish in the way of bone growing, and there are some things I will not undertake because I realize my limitations in that respect.

I wish heartily to indorse the main point of Dr. Dewey's paper, which is this: It is necessary not only to get the teeth into normal occlusion or normal contact and cusp relation but to get all the forces which influence the teeth in normal correlation as far as possible. It is not always possible to get all of these forces working normally, and I thought of that particularly in listening this morning to the paper of Dr. Grieves when he explained those factors that influenced bone development over which we have absolutely no control. We may get all the factors influencing occlusion over which we have any control into good normal condition, and yet fail because of other factors influencing growth and development over which we have no control.

The second point of the paper points out very clearly that it is necessary to construct retaining appliances in such a way as to allow freedom of tooth motion. That is quite important. The appliance should be so arranged that the teeth can respond to the natural impact of occlusal and muscular force. I may say here that it is almost impossible, so far as I have been able to learn, to devise a retainer that will absolutely do this.. We simply have to select an appliance that offers the least hindrance to normal function and then eliminate it as soon as it is possible to do so, substituting the natural forces of retention. But we must also remember that we cannot retain a tooth mechanically for any preconceived length of time and remove the retainers and expect Nature to do the rest. It has been too commonly the custom to consider our active work in treatment finished when the retaining appliances are put on, and that all we need to do is to see that these retaining appliances stay in place during the prescribed length of time. But our efforts will not be attended with success unless during the time the appliances were being worn the natural forces of retention were being developed. That is a line of thought upon which we can well expend a good deal of effort in determining how we can best develop muscular balance for one thing and general tone and vigor for another, to assist mechanical retention.

I am in the same position with Dr. Lourie, in **Dr. Frank M. Gasto, Cleveland.** that I cannot see very much relation between the paper by Dr. Dewey and his talk, although both have been quite interesting to me.

We all agree with Dr. Dewey that retention is one of the most important parts of the orthodontic procedure. In fact, it is the final word in every case. No matter how beautiful the results of the operative procedure may be, if the retention is not properly cared for there will be untimate failure.

There is one other point in connection with retention which must be considered, and that is growth during the retaining period. A rigid retaining appliance should never be placed for a long period during the time of development. There are many forms of adjustable appliances which can be used in such cases.

I would like to say also that I believe in the use of removable retaining appliances. There are many cases where they are a distinct advantage, especially in the latter part of the retention. Let me also mention the use of a plate. In some cases where the upper incisors have been moved linguallly and you wish to hold these indefinitely, it can be done by the use of a plate with a labial wire. Many patients will willingly wear such a retainer a part of the time, at night, and it

is just as effective. It allows also for any individual tooth movement and does not interfere with the function.

Dr. Ottolengui.

Will you please tell us how you place the wire?

I vulcanize it in the plate. I bring it over, as

Dr. Gasto. a rule, between the first bicuspid and cuspid, fitting it close between the two teeth just in the anterior region, that is, in cases where I have made expansion of the arch and also wish to hold the anterior teeth.

I wish to impress again the importance of function. We must have function of the teeth in order to have a healthy condition and development, and the appliances must not interfere with this.

..

Dr. Federspiel.

It may seem ignorant on my part, but I do not quite understand what is meant by cell metabolism. I wish Dr. Dewey would make that clear to me.

Dr. Kemple. I did not catch the meaning of Dr. Dewey's remarks in regard to the development of the mandible. If I understood him, he referred to the relation between the underlying bones and the dental arch.

Dr. Dewey. By cell metabolism I mean cell growth, and cell growth is the basis of all development. If you move a tooth you must get normal action of cells which fill the periodontal membrane and alveolar process which keep on building. There are various things which interfere with that, as has been shown to-day, but you must remember them.

Dr. Kemple asked what I meant by developing the underlying structures supporting the dental arch and alveolar process. I mean the body of the mandible will develop as a result of the normal forces of occlusion and the normal forces of retention. The receding chin and underdeveloped mandible you get in the lower arch associated with mouth breathing as the result of the abnormal stress of respiration. The mandible has various functions, one of which is the function of respiration which is controlled or influenced by the muscles from the hyoid to the mandible. The mandible has function in speech, and according to a great many investigators, the reason man has a greater chin than the ape is because man talks. When you change a set of teeth from mal-occlusion to normal, the normal action of the muscles of respiration causes the chin in man to develop. If you move the lower teeth forward bodily and set them in proper position, they will cause the mandible to develop. I can show you photographs of patients before and after, showing that the mandible has increased in length.

Dr. Kemple. May not that be changed in relation to the temporo-mandibular articulation?

Dr. Dewey.

You cannot change the temporo-mandibular articulation.

Dr. Kempler.

How about all the Class II and III cases that have been treated?

I can show you a few X-rays of such cases

Dr. Dewey. in which it has not changed. I can show you X-rays that point out that after these conditions have been treated they are the same as before. The temporo-mandibular articulation anatomically is surrounded by ligaments so that the mesio-distal relation cannot change.

Yesterday I showed the model of a case of a

Dr. Kempler. young lady, twenty-two years of age. It was decidedly a Class III condition. At least, all the lower incisors and cuspids closed mesially to the upper cuspids, and that relation was changed within six months without any apparent tipping of the upper incisors. Do you mean to tell me you can produce sufficient growth of bone in that length of time to account for that change, if the mandible has not slipped back in the temporo-mandibular articulation? The maxilla must be moved forward. Does such growth of bone take place in that comparatively short time?

I cannot say it did in that case, but it would

Dr. Dewey. be possible for it to do so. There is no reason why bone should not grow as rapidly in the region of the teeth and alveolar process as anywhere in the body. We know that after a surgical operation bone tissue will fill in the space in a comparatively short time. The reason it takes so long before it develops around teeth is because abnormal conditions are present. There are few cases of Class III which are the result of luxation, where the mandible is moved forward accidentally and which may return to a normal position as the result of treatment. In Class II cases, or distal relation of the lower teeth, I do not think the condyle moves forward, and if it does you do not want it to, because I do not believe you can hold it there.

If you take a child, eight years of age, with

Dr. Young. a Class II condition, widen the upper arch, put nothing on the lower arch, and simply make an attachment to the first cupid and first permanent molar on each side to carry a lingual arch and to keep the expansion, how do you account for the fact that the lower teeth move into normal occlusion if there is no change in the temporo-mandibular articulation?

The articulation remains unaltered, the condyles slide back, and the mandible moves forward. The

Dr. Dewey. condyle will slip backward coincidentally with the development of the body of the mandible. My contention is you cannot keep the condyle forward in its normal position.

Dr. Remple. Is it not possible to establish a new seat for the mandible in that joint, just as they make a new hip-joint in the Lorenz operation?

Dr. Dewey. It might be, but I do not think you would ever do it. Anything is possible.

Dr. Remple. Is not the Lorenz operation a successful one?

Dr. Dewey. It is in some cases, but it is not the establishment of a new joint. I do not think you can say that in the Lorenz operation a new joint is established.

Dr. Ottolengui. I do not think it is quite fair to compare those two operations establishing a new hip-joint and changing the position of the condyle. You have all of you seen thrown on the screen pictures of skulls, and the lecturer has said, "this is the skull of a child at the age of three months, observe the glenoid region. This is the skull of a child at six months, and this the skull of a child at ten months," but, as a matter of fact, you can find all of the normal variations in some degree in young children, and sometimes at a very early age, you may have a deep fossa and a high eminence and the position of the condyle could not be changed unless you cause resorption of the eminence. But it is my conception that in some children the eminence is so flat at the time of operation, that it may be possible to hold the mandible forward long enough so that the glenoid fossa will assume such shape as will establish the position permanently. This is pure speculation on my part, but it has been my experience, as Dr. Young pointed out, that in some instances without any help whatever the mandible will slide forward and remain there. In other instances it will go back in spite of long retention.

Dr. Dewey. My opinion is based on comparative embryologic and anatomic evidence. The anatomic evidence is based on examinations of skulls I could find or hear of that showed Class II and Class III conditions. In distal relation of the lower arch the mastoid process, the external auditory meatus, and the condyles occupy the same relation. Then you will find cases in which the shape of the condyle does change as a result of the abnormal occlusion. You may compare the mesiodistal relation of the condyle with those other landmarks in the same position, but the shape is different. In the case Dr. Young mentioned, where the mandible moves as the upper arch is widened, the mandible moves forward as the result of muscular effort, but the condyle is brought back to its old position by lengthening of the body of the mandible in a short time, say in two or three weeks. The action of the tongue on the lower anterior teeth will cause the body of the mandible to move forward or to lengthen; but in asking these questions you are getting off the question of retention which is another proposition.



Society Papers

Blood Findings in 162 Consecutive Cases of Chronic Oral Infection Associated with Teeth.

By Wm. H. G. LOGAN.

*Read before the Panama-Pacific Dental Congress, San Francisco, California,
Section VI, September 1, 1915.*

Since most persons over forty years of age having natural teeth are believed to be afflicted with local areas of chronic oral infection, involving either the periapical or gingival pericemental and alveolar structures, and because we have scientific evidence of such a conclusive nature that pronounced systemic effects may result from periodental focal infections presented to the profession by Hunter in 1900, Kenneth Goadby in 1911, Billings, Davis, Nicol, Rosenow and Liebman in 1912 and Hartzell in 1914; and because it is the belief of a vast number of close observers that most of such patients remain free from disease that can be traced to oral focal infections, to the end that they are inclined to wait until the patient shows pronounced secondary infections before demanding the eradication of these foci; yet, because of the pathologic dictum, that in the presence of lowered resistance secondary involvements are most likely to occur from chronic infections, it has become essential to ascertain the usual blood findings in consecutive cases of oral sepsis to determine whether valuable information could be collected, which would be of benefit in reaching a decision that a chronic oral infection, though apparently producing no secondary effects, may in reality be sufficiently active to produce characteristic blood changes, which would be of diagnostic aid in deciding in favor of treating the infected



foci with retention of the teeth, or demanding immediate extraction and possibly curetttement of the area.

Before discussing the case records, I desire to call attention to the fact that they are all of patients presenting at my office; therefore, these reports should not be compared with those secured from patients confined to the hospital from ill health.

I herewith report on the blood findings* in 162 consecutive cases of chronic oral infection associated with teeth, of which 110 are advanced pyorrhea cases where the clinical evidence of pus was present, and in ninety-six per cent. of the cases some teeth had been lost or were so seriously involved with the disease that extraction was demanded. The remaining fifty-two cases are of patients having chronic periapical infection without evacuating sinuses; however, eighteen cases had pyorrhea co-existing. For the convenience of study, I have divided them into the following six groups:

1. Pyorrhea cases with fair to normal blood count, reporting five typical cases of the sixty-two belonging to this group.
2. Pyorrhea cases with fair to normal hemoglobin content and erythrocyte count and slight leucopenia present, reporting five typical cases of the thirty-one belonging to this group.
3. Pyorrhea cases where the pockets extended into the periapical area with fair to normal hemoglobin content and erythrocyte count and slight to moderate leucocytosis present, reporting five typical cases of the seventeen belonging to this group.
4. Cases of chronic periapical infection not having evacuating sinuses, with pyorrhea co-existing and with fair to normal hemoglobin content and erythrocyte count and slight to moderate leucocytosis present, reporting five typical cases of the nineteen belonging to this group. Also reporting under this group the single case of pronounced anemia presenting in the entire series.
5. Cases of chronic periapical infection not having evacuating sinuses and the body thought to be free from all other focal infective processes, with fair to normal hemoglobin content and erythrocyte count and slight to moderate leucocytosis present, reporting ten typical cases of the twenty-nine belonging to this group.
6. Cases of chronic periapical infection not having evacuating sinuses and the body thought to be free from all other focal infective processes, with fair to normal hemoglobin content and erythrocyte count and moderate leucopenia present, reporting two typical cases of the four belonging to this group.

*These examinations were never taken for some hours after the patient had partaken of a hearty meal.

Items of Interest

Group I.

Pyorrhea cases with fair to normal blood count, reporting five typical cases of the sixty-two belonging to this group.

Blood analysis.

Case 17.	Mrs. H. June 24, 1914. Age 38.	Case 6.	Mrs. D. April 10, 1914. Age 59.
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*Hemoglobin	85%	90%
**Erythrocytes	4,472,000	4,772,000
**Leucocytes	7,800	7,400
Polymorphonuclears ...	64%	65%
Large Mononuclears...	4%	.....	4%
Small Mononuclears...	32%	.....	31%
Eosinophiles	0	.....	0
Systolic	132	.....	140
BLOOD PRESSURE. Diastolic..	90	.....	98
(Tycos)			
Pulse pressure...	42	.....	42
Teeth lost from pyorrhea..	3	.....	4
Teeth extensively involved..	28	22

Case 128.	Mr. H. March 28, 1915. Age 59.	Case 26.	Mr. F. May 27, 1914. Age 58.
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Hemoglobin	97%	90%
Erythrocytes	5,088,000	4,712,000
Leucocytes	7,000	7,000
Polymorphonuclears	63%	65%
Large Mononuclears....	9%	.....	2%
Small Mononuclears....	26%	.....	31%
Eosinophiles	2%	.....	2%
Systolic	132	.....	153
BLOOD PRESSURE. Diastolic..	100	.....	105
Pulse pressure...	32	.....	48
Teeth lost from pyorrhea..	6	.....	8
Teeth extensively involved..	25	.....	21

*Sahli.

**Per cu. mm.

Society Papers

Case 24. Mrs. N. May 13,
1915. Age 44.

Hemoglobin 80%
 Erythrocytes 4,408,000
 Leucocytes 7,000
 Polymorphonuclears 65%
 Large Mononuclears..... 4%
 Small Mononuclears..... 30%
 Eosinophiles 1%
 Systolic 114
 BLOOD PRESSURE. Diastolic.. 80
 Pulse pressure... 34
 Teeth lost from pyorrhea.. 1
 Teeth extensively involved.. 29

Group 2.

Pyorrhea cases with fair to normal hemoglobin content and erythrocyte count and slight leucopenia present, reporting five typical cases of the thirty-one belonging to this group.

Hemanalysis.

Case II.—A. Mrs. G. M. April 6,
1914. Age 46.

Hemoglobin 80%
 Erythrocytes 4,488,000
 Leucocytes 6,000
 Polymorphonuclears 60%
 Large Mononuclears..... 5%
 Small Mononuclears..... 35%
 Eosinophiles 0

 Systolic 114
 BLOOD PRESSURE. Diastolic.. 80

 Pulse pressure... 34
 Teeth lost from pyorrhea.. 5
 Teeth extensively involved.. 21

Case II.—B. Second examination.
May 7, 1915.

Hemoglobin .....	.....	94%
Erythrocytes .....	.....	4,632,000
Leucocytes .....	.....	8,000
Polymorphonuclears .....	.....	61%
Large Mononuclears.....	.....	6%
Small Mononuclears.....	.....	32%
Eosinophiles .....	.....	1%

Second blood examination made some months after infection was controlled.

Items of Interest

Case 67.	Mrs. F. Nov. 12, 1914. Age 39.	Case 119.	Mrs. A. March 1, 1915. Age 33.
Hemoglobin	87%	.....	92%
Erythrocytes	4,552,000	.....	4,308,000
Leucocytes	6,400	.....	6,600
Polymorphonuclears	63%	.....	63%
Large Mononuclears.....	5%	.....	7%
Small Mononuclears.....	32%	.....	30%
Eosinophiles	0	.....	0
Systolic	125	.....	120
BLOOD PRESSURE. Diastolic..	94	.....	90
Pulse pressure...	31	.....	30
Teeth lost from pyorrhea..	3	.....	2
Teeth extensively involved..	19	.....	15
 Case 135.	Mrs. P. Sept. 19, 1914. Age 57.	 Case 65.	Mrs. S. Oct. 27, 1914. Age 62.
Hemoglobin	88%	.....	88%
Erythrocytes	4,024,000	.....	4,640,000
Leucocytes	5,600	.....	6,600
Polymorphonuclears	54%	.....	58%
Large Mononuclears.....	4%	.....	9%
Small Mononuclears.....	39%	.....	31%
Eosinophiles	3%	.....	2%
Systolic	130	.....	120
BLOOD PRESSURE. Diastolic..	90	.....	92
Pulse pressure...	40	.....	28
Teeth lost from pyorrhea..	5	.....	15
Teeth extensively involved..	15	.....	9

Group 3.

Pyorrhea cases where the pockets extended into the periapical area, with fair to normal hemoglobin content and erythrocyte count and slight to moderate leucocytosis present, reporting five typical cases of the seventeen belonging to this group.

Hemanalysis.

Case 77.—A. Miss L. April 10,
1914. Age 46. **Case 77.—B.** Second examination.
June 18, 1914.

Hemoglobin	83%	.....	87%
Erythrocytes	4,392,000	.....	4,384,000
Leucocytes	9,000	.....	7,000
Polymorphonuclears	65%	.....	65%
Large Mononuclears.....	7%	.....	8%
Small Mononuclears.....	25%	.....	27%
Eosinophiles	3%	.....	0

Systolic	120		
BLOOD PRESSURE. Diastolic..	84	Second examination made some	
Pulse pressure..	36	months after infection was	
Teeth lost from pyorrhea..	3	controlled.	
Teeth extensively involved..	20		
Pockets involving root ends.	3		

Case 8. Mrs. G. April 15,
1915. Age 52. **Case 10.** Mr. R. April 14, 1914.
Age 58.

Hemoglobin	90%	.....	99%
Erythrocytes	4,856,000	.....	4,744,000
Leucocytes	8,400	.....	8,800
Polymorphonuclears	66%	.....	63%
Large Mononuclears.....	8%	.....	7%
Small Mononuclears.....	26%	.....	30%
Eosinophiles	0	.....	0

Systolic	136	.....	160
BLOOD PRESSURE. Diastolic..	92	.....	120
Pulse pressure..	44	.....	40
Teeth lost from pyorrhea..	5	.....	5
Teeth extensively involved..	15	.....	15
Pockets involving root ends.	3	.....	5

Case 37. Mr. F. July 1, 1914.
Age 49. **Case 71.** Mrs. E. Nov. 19,
1914. Age 43.

Hemoglobin	90%	.....	92%
Erythrocytes	4,424,000	.....	4,928,000
Leucocytes	8,200	.....	8,200

(Case 37 continued)

Polymorphonuclears	67%	.....	67%
Large Mononuclears.....	6%	.....	4%
Small Mononuclears.....	26%	.....	28%
Eosinophiles	1%	.....	1%
Systolic	118	.....	120
BLOOD PRESSURE. Diastolic..	84	.....	89
Pulse pressure..	34	.....	31
Teeth lost from pyorrhea..	2	.....	3
Teeth extensively involved..	18	.....	19
Pockets involving root ends.	2	.....	2

Group 4.

Cases of chronic periapical infection not having evacuating sinuses, with pyorrhea co-existing and with fair to normal hemoglobin content and erythrocyte count and slight to moderate leucocytosis present, reporting five typical cases of the eighteen belonging to this group.

Hemanalysis.

Case 70.—A.	Miss A. Nov. 16, 1914. Age 63.	Second examination.	Case 70.—B.	Dec. 14, 1914.
Hemoglobin	81%	.....	.....	88%
Erythrocytes	4,344,000	.....	.....	4,368,000
Leucocytes	9,600	.....	.....	7,400
Polymorphonuclears	69%	.....	.....	66%
Large Mononuclears.....	7%	.....	.....	7%
Small Mononuclears.....	23%	.....	.....	26%
Eosinophiles	1%	.....	.....	1%
Systolic	136	.....	.....	.....
BLOOD PRESSURE. Diastolic..	102	.....	.....	.....
Pulse pressure..	34	.....	.....	.....
Teeth lost from pyorrhea..	3	.....	.....	.....
Teeth extensively involved..	13	.....	.....	.....



Fig. 1.

Periapical infection about second bicuspid as shown in Fig 1.
The normal blood count shown in the second examination was

brought about by treatment of the periapical infection through the root canal. The blood count did not change to normal with the pyorrhea treatment.

	Mr. M. June 1, 1914.	Mr. S. Nov. 23, 1914.
Case 28.	Age 44.	Case 72.
Hemoglobin	97%	..... 93%
Erythrocytes	4,800,000	..... 4,736,000
Leucocytes	9,800	..... 13,000
Polymorphonuclears	66%	..... 75%
Large Mononuclears.....	4%	..... 2%
Small Mononuclears.....	30%	..... 22%
Eosinophiles	0	..... 1%
Systolic	143	..... 116
BLOOD PRESSURE. Diastolic..	106	..... 90
Pulse pressure...	37	..... 26
Teeth lost from pyorrhea..	2	..... 7
Teeth extensively involved..	23	..... 23
Periapical infections...1..moderate		..... 2..moderate
Case 110.—A. Mrs. W. Feb. 19,	Mrs. W. Feb. 19,	Second examination.
1915. Age 53.		Case 110.—B. April 9, 1915.
Hemoglobin	97%	..... 91%
Erythrocytes	4,768,000	..... 4,536,000
Leucocytes	9,000	..... 7,000
Polymorphonuclears	67%	..... 58%
Large Mononuclears.....	7%	..... 6%
Small Mononuclears.....	25%	..... 33%
Eosinophiles	1%	..... 3%
Systolic	120	
BLOOD PRESSURE. Diastolic..	80	
Pulse pressure...	40	
Teeth lost from pyorrhea..	3	
Teeth extensively involved..	15	

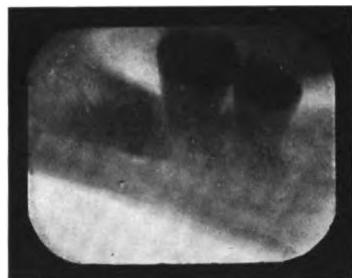


Fig. 2.

Infection about impacted tooth shown in Fig. 2.

Items of Interest

Pyorrhea not treated in this case—the imbedded bicuspid was removed and the infected area curetted. The blood count returned to normal with the presence of pyorrhea as shown by the second examination.

Case 96.—A. Miss G. Jan. 15, 1915.
Age 31.

Hemoglobin	91%
Erythrocytes	4,556,000
Leucocytes	13,400
Polymorphonuclears	73%
Large Mononuclears.....	5%
Small Mononuclears.....	22%
Eosinophiles	0

Systolic 120

BLOOD PRESSURE. Diastolic.. 85

Pulse pressure... 35

Teeth lost from pyorrhea....none

Teeth extensively involved.. 10

Periapical infections..1..moderate

Case 96.—B. Second examination.
June 16, 1915.

.....	90%
.....	4,456,000
.....	7,800
.....	62%
.....	2%
.....	36%
.....	0

Second blood examination was made after the infection was brought under control.

Case 175. Dr. Y.
Age 44.

	Aug. 15, 1913	Aug. 25	Sept. 15	Sept. 20
Erythrocytes.....	2,300,000	1,500,000	3,200,000	3,800,000
Oct. 10		Nov. 10	Nov. 25	Dec. 19
"	4,000,000	4,028,000	4,300,000	4,700,000

Periapical infections.... 1moderate, and advanced pyorrhea. Tooth extracted and area curetted, and pyorrhea treated during the month of October.

This pronounced case of anemia was held by the various physicians in charge to be due to the oral sepsis associated with his teeth. The patient at the present time is in reasonably good health and carrying on his practice of medicine and surgery as formerly.

Group 5.

Cases of chronic periapical infection not having evacuating sinuses and the body thought to be free from all other focal infective processes, with fair to normal hemoglobin content and erythrocyte count and slight

to moderate leucocytosis present, reporting ten of the twenty-nine belonging to this group.

Hemanalysis.

Case 106.—A. Miss G. Feb. 12, 1915. **Case 106.—B.** Second examination. April 21, 1915.

Hemoglobin	91%	.....	96%
Erythrocytes	4,456,000	.....	4,784,000
Leucocytes	11,200	.....	7,000
Polymorphonuclears	74%	.....	61%
Large Mononuclears.....	2%	.....	5%
Small Mononuclears.....	24%	.....	32%
Eosinophiles	0	.....	2%
Systolic	138		
BLOOD PRESSURE. Diastolic..	100		
Pulse pressure...	38		

Area of chronic infection about impacted cuspid shown in Fig. 3. Impacted tooth removed and area curetted, February 12, 1915.



Fig. 3.

Case 54.—A. Mr. P. Sept. 28, 1914. **Case 54.—B.** Second examination. Nov. 2, 1914.

Hemoglobin	89%	.....	96%
Erythrocytes	4,640,000	.....	5,016,000
Leucocytes	14,200	.....	7,000
Polymorphonuclears	79%	.....	65%
Large Mononuclears.....	5%	.....	5%
Small Mononuclears.....	16%	.....	30%
Eosinophiles	0	.....	0

Periapical infections.... Imoderate.

Tooth removed and area surgically treated September 28, 1914.

Items of Interest

Case 78.	Mr. G. Dec. 31, 1914. Age 56.	Case 120.	Miss D. Mar. 2, 1915. Age 35.
Hemoglobin	94%	.....	92%
Erythrocytes	4,816,000	.....	4,472,000
Leucocytes	8,800	.....	8,800
Polymorphonuclears	64%	.....	68%
Large Mononuclears.....	4%	.....	6%
Small Mononuclears.....	30%	.....	26%
Eosinophiles	2%	.....	0
Systolic	130	.....	132
BLOOD PRESSURE. Diastolic..	92	.....	100
Pulse pressure...	38	.....	32
Periapical infections..2..moderate		.....	1..slight

Case 143.	Mr. W. April 21, 1915. Age 50.	Case 148.	Mrs. R. April 25, 1915. Age 49.
Hemoglobin	97%	.....	97%
Erythrocytes	4,776,000	.....	4,688,000
Leucocytes	11,600	.....	9,000
Polymorphonuclears	74%	.....	68%
Large Mononuclears.....	7%	.....	7%
Small Mononuclears.....	18%	.....	24%
Eosinophiles	1%	.....	1%
Systolic	138	.....	128
BLOOD PRESSURE. Diastolic..	96	.....	90
Pulse pressure...	42	.....	38
Periapical infections..2..slight 1..moderate		.....	1..slight

Case 81.—A.	Mrs. S. Jan. 7, 1915. Age 49.	Case 81.—B.	Second examination. Jan. 18, 1915.
Hemoglobin	89%	.....	95%
Erythrocytes	4,586,000	.....	4,776,000
Leucocytes	11,200	.....	8,800
Polymorphonuclears	70%	.....	64%
Large Mononuclears.....	4%	.....	5%

(Case 81a continued)

Small Mononuclears.....	25%	.....	30%
Eosinophiles	1%	.....	1%
Systolic	124		
BLOOD PRESSURE. Diastolic..	90		
Pulse pressure...	34		

Periapical infections. . . . 1
moderate as shown in Fig. 4. Second blood examination was made eleven days after the cavity was curetted.

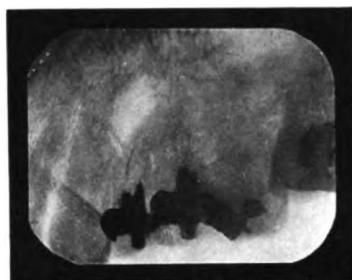


Fig. 4.

Case 68.—A. Mr. T. Nov. 14, 1914.
Age 61.

Hemoglobin	90%	.....	92%
Erythrocytes	4,832,000	.....	4,936,000
Leucocytes	12,800	.....	10,000
Polymorphonuclears	73%	.....	62%
Large Mononuclears.....	4%	.....	8%
Small Mononuclears.....	22%	.....	29%
Eosinophiles	1%	.....	1%

Systolic 137 | | |
BLOOD PRESSURE. Diastolic.. 100

Pulse pressure... 37

Case 68.—B. Second examination.
Nov. 20, 1914.

Hemoglobin	90%	.....	92%
Erythrocytes	4,832,000	.....	4,936,000
Leucocytes	12,800	.....	10,000
Polymorphonuclears	73%	.....	62%
Large Mononuclears.....	4%	.....	8%
Small Mononuclears.....	22%	.....	29%
Eosinophiles	1%	.....	1%

Case 68.—C. Third examination.
Jan. 23, 1915.

Hemoglobin	94%
Erythrocytes	4,888,000
Leucocytes	8,000
Polymorphonuclears	60%
Large Mononuclears.....	9%
Small Mononuclears.....	30%
Eosinophiles	1%

Periapical infections.... 3moderate.

This patient was suffering from neurasthenia of two years' standing, which showed immediate improvement with eradication of the infected foci. He has practically regained his normal health at this time without other than the surgical treatment indicated.

Case 64.—A.	Dr. Mc. Oct. 23, 1914. Age 48.	Second examination.
Hemoglobin	70%	..... 88%
Erythrocytes	4,440,000	..... 4,704,000
Leucocytes	10,400	..... 8,200
Polymorphonuclears	72%	..... 63%
Large Mononuclears.....	1%	..... 7%
Small Mononuclears.....	25%	..... 30%
Eosinophiles	2%	..... 0
Systolic	130	
BLOOD PRESSURE. Diastolic..	100	
Pulse pressure...	30	

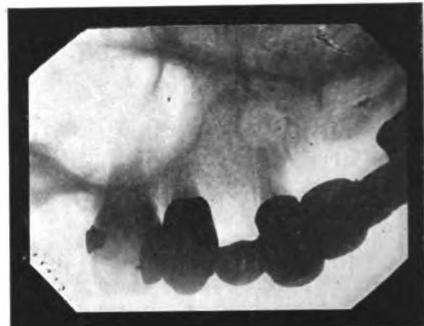


Fig. 5.

Case 64.—B. Third examination.
Nov. 4, 1914.

Hemoglobin	93%
Erythrocytes	4,732,000
Leucocytes	7,600
Polymorphonuclears	64%
Large Mononuclears.....	6%
Small Mononuclears.....	29%
Eosinophiles	1%

Periapical infection.... 2moderate, one shown in Fig. 5.
A brief report of the history of Case 64 is here published, as a fair example of one of the usual findings in this group.



- History.—** Presented with serous iritis. All causative factors with the exception of the pyorrhœa about the four lower incisors had been excluded. The chronic infection about these teeth thought to be the definite cause of the iritis. Teeth extracted one week ago, patient feels there has been some improvement since the extraction of the teeth. Mouth had been examined and declared to be free from all chronic infection.
- Examination.—** Film radiograph of all pulpless teeth were advised. Two bone abscesses were found—more important about upper left cuspid and lower right second bicuspid. Blood examination taken previous to the extraction of the teeth about which bone abscesses were found showed effects of chronic infection upon the system.
- Operation.—** Teeth extracted and bone cavities curetted.
- Oct. 24, 1914.—** Teeth to be extracted were dried and crowns painted with tincture of iodin and the area protected with sterile gauze. Teeth then carefully removed to prevent bacterial contamination—root ends amputated with sterile saw and placed in sterile bottles—sent to the Columbus Medical Laboratories for aerobic and anaerobic tests for the presence of bacteria.
- Nov. 3, 1915.—** Vision reported normal by those in charge.
Columbus Medical Laboratories' Report.
Specimen of two teeth.
- Upper Tooth.—** Aerobic:
Streptococci—present (*Streptococcus pyogenes*).
Staphylococci—present (*Staphylococcus pyogenes*)
Saprophytic bacilli—present. aureus).
- Anaerobic:
Pus cocci—present.
Proteus bacillus—present.
- Lower (dry tooth).—** Aerobic:
Staphylococci—present (*Staphylococcus pyogenes*)
Saprophytic bacilli—present aureus).
- Anaerobic:
Very few cocci grew.

Items of Interest

Case 79.—A. Mr. B. Jan. 2, 1915.
Age 32.

Hemoglobin	93%	.....	100%
Erythrocytes	4,840,000	.....	5,304,000
Leucocytes	9,600	.....	10,000
Polymorphonuclears	70%	.....	70%
Large Mononuclears.....	5%	.....	4%
Small Mononuclears.....	25%	.....	23%
Eosinophiles	0	.....	3%
Systolic	124		
BLOOD PRESSURE. Diastolic..	98		
Pulse pressure...	26		



Fig. 6.

Periapical infections. . . . i . . . slight as shown in Fig. 6.
Began root canal treatment on January 8th, but was unable to reach the apex with instruments until February 2nd.

Case 79.—C Third examination.
Feb. 12, 1915.

Hemoglobin	100%	.....	102%
Erythrocytes	5,016,000	.....	5,128,000
Leucocytes	8,000	.....	8,800
Polymorphonuclears	60%	.....	66%
Large Mononuclears.....	8%	.....	3%
Small Mononuclears.....	30%	.....	30%
Eosinophiles	2%	.....	1%

The above examination was made ten days after remedies had been applied to the root end—with five days intermission. Root canal filling placed March 15th, but the radiograph taken showed the apical third unfilled.

Case 79.—D. Fourth examination.
Mar. 18, 1915.

Hemoglobin	102%	.....	102%
Erythrocytes	5,128,000	.....	5,128,000
Leucocytes	8,800	.....	8,800
Polymorphonuclears	66%	.....	66%
Large Mononuclears.....	3%	.....	3%
Small Mononuclears.....	30%	.....	30%
Eosinophiles	1%	.....	1%

The above examination taken three days after the root canal filling was placed shows the infective process again becoming active.



Case 79.—E. Fifth examination.
Aug. 16, 1915.

Hemoglobin 100%
Erythrocytes 4,976,000
Leucocytes 10,400
Polymorphonuclears 72%
Large Mononuclears..... 2%
Small Mononuclears..... 24%
Eosinophiles 2%



Fig. 7.

The root canal filling was removed on April 6th and a number of unsuccessful efforts made to enlarge the canals to the apex. A treatment was placed on May 25th and further attention discontinued. On August 16th the blood examination showed the re-establishment of the infective process, practically corresponding to the findings recorded January 2nd.

Group 6.

Cases of chronic periapical infection not having evacuating sinuses and the body thought to be free from all other focal infective processes, with fair to normal hemoglobin content and erythrocyte count and moderate leucopenia present, reporting two of the four belonging to this group.

Hemanalysis.

Case 123.—J. Dr. P. Mar. 5, 1915. **Case 123.—B.** Second examination.
Age 44. Aug. 26, 1915.

Hemoglobin	94%	.....	95%
Erythrocytes	4,712,000	.....	4,888,000
Leucocytes	5,000	.....	7,200
Polymorphonuclears	50%	.....	61%
Large Mononuclears.....	8%	.....	4%
Small Mononuclears.....	41%	.....	33%
Eosinophiles	1%	.....	2%

Systolic 130
BLOOD PRESSURE. Diastolic.. 90

Pulse pressure... 40
Periapical infections...i...moderate Periapical infections...i...moderate
(See Fig. 8)

Case 157. Dr. H. May 24, 1915.
Age 56.

Hemoglobin	92%
Erythrocytes	4,840,000
Leucocytes	5,800
Polymorphonuclears	58%
Large Mononuclears.....	3%
Small Mononuclears.....	37%
Eosinophiles	2%

(Radiograph of this case shown
in Fig. 9.)

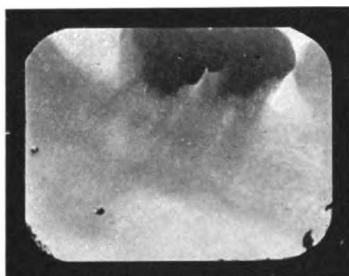


Fig. 8.

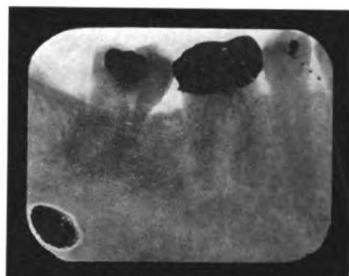


Fig. 9.

Discussion of Groups, Cases and Conclusions.

In the examinations as here made, I found in 100 out of 162 cases that blood changes had occurred that were held to be the sequence of chronic oral infections associated with teeth.

That neither pronounced nor moderate anemia was commonly associated with chronic oral infections in this series, as claimed by many authors; however pronounced anemia was found once as shown in Case No. 175, in group 4.

Anemia. That leucopenia was more constant than leucocytosis in pyorrhea cases where the blood findings were abnormal; furthermore, leucopenia was more frequent in those cases where the pyorrhea pockets did not involve the root ends and in the absence of periapical focal infection without discharging sinuses.

Leucopenia. That leucocytosis when associated with pyorrhea cases was most frequent where the pyorrhea pockets extended nearly to or did involve the root ends.

That abnormal blood findings were present in forty-eight of the

one hundred and ten pyorrhea cases examined. Full urinalysis was made of all pyorrhea cases although not here reported.

That leucocytosis was present in forty-seven of the fifty-two cases of periapical infections without discharging sinuses—but that leucopenia does occur under the same conditions is presented in Group 6. Let the foregoing statement be not misconstrued to mean that either leucocytosis or leucopenia is always present when a chronic periapical infection without a discharging sinus is found, for periods arise when the effect of the infective biproducts is so slight that its result is not manifested in a blood change. But, since severe secondary infections could occur during this period, a focal infection although producing no characteristic blood change must always be looked upon as a menace to the health of the patient and its eradication demanded.

**Interesting Case
Involving Defective
Root Filling.**

I desire to call particular attention to two cases, Nos. 70 and 79, wherein secondary effects resulted from the periapical infection shown in the illustration accompanying the reports. In Case No. 79, a few days after the dentist had been able to carry the remedy to or through the root end, the blood count changed to normal and the secondary involvement began to improve and continued to do so until a brief period after the root canals were filled; then upon complaint from the patient that the original secondary trouble had returned, another blood count was taken which showed a slight leucocytosis. A radiograph then taken proved that the root canals had not been more than two-thirds filled. The root canal filling was removed and treatment again undertaken. The dentist in charge decided he would be unable to perfectly fill the canals, and the patient was allowed to go with the remedy in the tooth for six weeks. The neuritis increased and the blood examination taken six weeks after the last treatment had been placed showed it to be practically the same as the original count. On August 21st, I removed the tooth and curetted the periapical area. The blood count taken three days after this was Hemoglobin 102, Erythrocytes 5,000,800, Leucocytes 8,400, Polys 63, Large 5, Small 32.

Case 70 was a patient thought to be suffering only from pyorrhea and the blood examination showed slight leucocytosis which did not materially change after treatment, nor did the first series of radiographs of the teeth show a definite rarefied area, but upon Ferradic test a pulpless bicuspid was found. This tooth was treated, root canal filled—the secondary involvement disappeared and the blood count returned to normal.

**Periapical
Infections.**

This gives me the opportunity to focus the attention of those called upon to determine the presence of chronic focal infections associated with teeth, not to confine their examinations only to the supporting structures and radiographs taken of the roots to outline rarefied areas, for one may have a pulpless tooth present without a rarefied periapical area and at the same time have a chronic infective process in the remnants of pulp tissue, which I have found in three cases to be accountable for a serious secondary effect.

Nor can one with any degree of assurance eradicate periapical infections by the mere extraction of teeth unless it be accompanied by a curetttement, for in two instances I have had patients go several months without any symptoms of the original secondary involvements and then have noted their reappearance without the development of any new focal infections, and upon making blood examinations I found the possible evidence of a chronic infection, although the tissue had healed with every appearance of being normal over the area where the tooth was removed. I then opened into the old infected tract, curetted it and in one instance the patient had a definite reaction similar to that experienced after injection of an autogenous vaccine during the original treatment. A second patient had a less marked reaction. Therefore it becomes necessary to do something more than to extract teeth or amputate roots and do an indifferent curetttement to secure positive elimination of focal infections associated with teeth.

In closing this communication I wish to express my appreciation of Hunter's early studies upon the effects of oral sepsis and the valuable contributions of Billings and his associates upon the systemic effects of chronic focal infections.

Oral Sepsis as Related to Systemic Disease.

W. H. STRIETMANN, M.D., Oakland, California.

Read before the Panama Pacific Dental Congress, Section II, Sept. 7, 1915.

The term "oral sepsis" and the recognition of this condition as a clinical entity is, I believe, to be accredited to William Hunter, of England, whose early recognition of the condition and its association with general debility and constant dyspepsia marks the beginning of the study of a subject which within the last decade has assumed gigantic proportions. Used by him to designate a condition related only to the teeth, it has since come into general use by the medical fraternity and includes as well, sepsis or infection originating in the tonsils or elsewhere in the

oral cavity. In our own country much of the pioneer work of educating the medical profession as well as the dental fraternity, and the laity to a recognition and understanding of the importance of this subject has emanated from Dr. M. H. Fletcher, of Cincinnati, Ohio. The subject to-day is occupying the medical profession to such an extent that hardly an issue of a medical journal appears, but one may find an article dealing with it at least indirectly, and yet I am sorry to say that the great majority of both professions are far from recognizing its importance.

I realize that what I shall have to say may be received with much honest doubt and perhaps considerable antagonism, but I trust that you will weigh the evidence thoroughly, and in the future study these cases conjointly with the physician with a view to determining for yourselves from personal experience whether or not one is justified in such conclusions as I shall draw.

For many years it has been known that systemic disease of certain types result from infections which were originally and primarily localized to a certain definite circumscribed focus of infection. Thus

**Systemic Infections
of Local Origin.** I might call to your attention an infection such as we meet in a carbuncle. Here the focus is primarily localized, but before long it extends and I have no doubt that all of you have heard of cases in which the individual so afflicted has finally succumbed to general septicemia, or as it is commonly known, "blood-poisoning." You have also no doubt heard of such cases of blood-poisoning following a trivial accident such as a cut in the finger which became infected, or an infected abrasion of the skin.

We know medically that syphilis has a primary focus in the so-called chancre and that subsequently the infection becomes generalized and invades the entire body. Gonorrhœa begins as a urethritis and may remain so—but on the other hand, it may become generalized and invade the joints of the body producing a gonorrhœal arthritis or "rheumatism," a gonorrhœal endocarditis, or even a septicaæmia which may prove rapidly fatal. I wonder also, if it has not come to your ears at some time or other that so-and-so died of blood-poisoning following the extraction of an ulcerated tooth?

In other words it means that before a patient can be the victim of a generalized infection, the infective organism must have gained admission to his general system through some primary focus or port of entry. And it would not be unreasonable to suppose that teeth and the structures in which they are imbedded may sometimes be held responsible as being the site of the primary focus. That such is really the case and not merely a generalization based on possibility we have now ample proof to demonstrate.

**Rosenow's
Experiments
and Findings.**

E. C. Rosenow of Chicago, has for some years been conducting a series of experiments which can leave no room for doubt as to the culpability of teeth and tonsils (oral sepsis) in the production of such systemic diseases as articular and muscular rheumatism, endocarditis, streptococcæmia and other allied conditions, and in order to more fully understand the subject, I shall briefly review his work and conclusions.

Starting with a certain form of streptococci, Rosenow was able, by varying the cultural conditions under which he grew these organisms, to transform the original type into other types of streptococci which we have been accustomed to look upon as distinctly different from one another, in their biologic, serologic, and clinical characteristics. Not only was he able to produce different forms of streptococci but he further changed streptococci into the diplococci of pneumonia and vice versa. The essential cultural factor which he employed in bringing about these changes was a variation in the degree of oxygen tension.

Variations in the degree of oxygen tension are more or less difficult to obtain by laboratory methods. On the other hand in nature we could ask for nothing better than the oral cavity when it becomes diseased. Thus tonsils when infected become edematous and congested in some areas; scarred, fibrous and contracted with little blood in others, so that they are well supplied with oxygen through the blood stream in some portions and very poorly supplied in others. The crypts themselves upon their surface and in their depths offer the same variability in degree of oxygen.

In pyorrhœa there is beside the endamebic disease demonstrated by Bass an associated infection with pus forming organisms, mostly streptococccic in type, which are commonly present in all mouths. This infection begins around the gingival margin and is probably not very dangerous as regards systemic diseases as long as it remains on the surface. The process extends, however, to the deeper structures, and Bass has demonstrated that the endamebæ themselves actually pick up and carry micro-organisms into the deeper structures.

Here the only oxygen obtainable is that in the tissues brought there by the blood stream. If the tissue be infected, it is soon inflamed and edematous; it resists further invasion very feebly, and the bacteria multiply. Edema interferes with circulation and interference with circulation increases edema, and what was once an ærobic culture of an organism now goes through various modifications in its cultural environment and the organism assumes different pathogenic properties. They gain entrance into the blood stream and finally, depending upon their particular



affinity for certain structures find lodgment in a small capillary loop and systemic disease has its beginning.

What may this systemic disease be? Rosenow's early work was confined to endocarditis or infection of the heart valves, and articular and muscular rheumatism. He found that cultures from tonsils or infected teeth, blind abscesses, etc., from an individual suffering from these diseases when injected into animals would produce similar lesions. He isolated from joints and muscles organisms which when injected into animals produced again the same disease. From pus derived from tonsils he found a mixture of types of organisms which produced mixed rheumatic and endocarditic changes. He showed further that these diseases were embolic in origin, that is, that a clump of organisms became lodged in a capillary loop, which was too small to admit of its passage and located in a tissue for which the given organism possessed a particular affinity. If this was in a heart valve, an endocarditis resulted; if in the tendinous end of a muscle, a muscular rheumatism developed; if in the synovial membrane of a joint, an articular rheumatism was the sequel. As might well have been supposed the list of infectious embolic disturbances has since grown and depending upon the lodgment of the bacterial embolus, we may have the pneumonias, nephritis, choleystitis, appendicitis, etc.

**Findings
of Other
Investigators.**

R. T. Woodyatt has called attention to the frequency with which exophthalmic goitre is associated with infected mouths, and Rosenow has in a number of such cases isolated a streptococcus from the thyroid gland which, when injected into animals, causes a hyperthyroidism to develop. Woodyatt has also collected a number of cases of glycosuria in which infections of the mouth were present and the glycosurias disappeared after the infected teeth or tonsils were removed. Wm. B. Wherry of Cincinnati, has studied a number of cases of infected mouths and has found that there are apparently periodic discharges of organisms into the blood-stream without any systemic disease.

This latter phenomenon of the periodic sowing of organisms into the general circulation probably explains the cause back of a case of paroxysmal, transient glycosuria observed by the author, which was independent of diet and disappeared entirely after the removal of a tooth which had an abscess at the root-tip revealed by the X-ray but otherwise undemonstrable by a very competent dentist.

Martin Fischer adds to the list, arterio-sclerosis which is to be looked upon as an embolic process in the minute blood vessels which supply the coats of the larger arteries of the body. It may likewise be-

come lodged in the capillaries of the kidney and produce nephritis, and as you have been told before, during this Congress, a so-called arthritis deformans may result from invasion of both the joints proper and the tissues about the joint.

The foregoing systemic diseases may, then, result from oral sepsis and other localized infections throughout the body. For the present let us confine ourselves to such conditions when they have as their primary focus, infection about the teeth including such things as pyorrhœa and blind abscess, and consider for a moment the causative factors of such infections.

The subject of pyorrhœa has received much attention lately and what I might say about the rôle of the endamoeba of Bass would be repetition of a thing which I have no doubt has been thoroughly thrashed out during this Congress. Furthermore it has no direct bearing upon the subject under discussion other than that the endamoebæ, as before mentioned, may and do carry microbic organisms into the deeper tissues and thus change the cultural conditions, which in turn alters the pathogenicity of the streptococcic group as proved by Rosenow.

**Etiology
of Root
Abscesses.**

Let us consider on the other hand the etiology of root abscesses. Here I would have you consider earnestly the causative factors spoken of by Martin H. Fischer. He calls attention to the fact primarily

that teeth are living structures. All of us know that living tissue of any kind is infinitely more resistant to infection than dead tissue. Hence any procedure which would tend to interfere with the vitality of the tooth or its surrounding structures must of necessity lower resistance to infection and predispose to local disease. Under this heading we must place the use of arsenic and strong antiseptics such as phenol tricresol, etc. These substances destroy bacteria no doubt, but they destroy living tissue as well.

Then comes the process known as devitalizing a tooth. The popular conception is that this process removes the nerve from the pulp canal, but as Fischer has pointed out, it also removes the nutrient artery from the center of a tooth, which naturally results in the death of the tooth centrally, again producing a favorable ground for the growth of bacteria. With the central canal deprived of its blood supply the pericementum alone is left to nourish the tooth, a thing which at best could be but very imperfectly done, but with an existing pyorrhœa or the further dental operation of placing a crown which necessitates the grinding away of the convex sides of projecting portions of the teeth, thus destroying many living cells again, it becomes an impossibility. Further the snugly fitting crown causes a pressure necrosis of the underlying cells. Infection in-

variably occurs around such crowns and the primary focus of possible subsequent systemic disease is planted.

The foregoing is not intended in anyway to reflect upon the technique of the dentist, the sterilization of hands and instruments, etc., for I am firmly convinced that this precaution is becoming general among them. Likewise devitalizing may be necessary for certain dental procedures now in use, but I trust the inexhaustible ingenuity of the dental profession will soon find a way to do without this method of treatment and indeed, it is well known that dentists abhor the full gold crown as much as the physicians, but find themselves compelled to use it in order to "save a tooth."

Should All
Teeth be
Saved?

This brings me to the important point in the discussion of the topic at hand. Is it wise always to attempt to "save the tooth"? About a year ago I observed a case of malignant endocarditis resulting

in the death of a woman who had a number of loose teeth that were continually bathed in pus and which I considered to be the origin of her systemic disease. After her death her husband came to me and I found a badly infected loose cuspid with two sinuses discharging through the gum above. An X-ray showed a root abscess about the size of a pea and I advised him to have it removed at once. He was called hurriedly to Denver whence I received a letter from him in which he said: "You will be glad to hear that I have found a very clever dentist here, who promises me that he can save my tooth." He did save the tooth and likewise the infection. The man has since had an articular rheumatism and found a dentist who was clever enough to extract the offending member.

I believe that I realize as well as the members of your profession the necessity of saving teeth, but I feel that there is a time when it is a crime to attempt to save teeth. And it is for the recognition of this that I beg your co-operation. The mouth is only a part of the body and yet it has been pitifully neglected by the average physician in the past. On the other hand because the primary infectious focus begins around the teeth is no good reason for the dentist to say "this tooth should not be removed; it can be saved." I have often had patients return to me with the remark that their dentists absolutely refuse to extract a given tooth announcing that it "has nothing to do with your rheumatism, etc." To such dentists I would respectfully suggest that they know nothing about it. On the other hand I am perfectly willing to admit that the medical profession know practically nothing about dentistry. To them a root abscess is in a class with an infected Fallopian tube, a mastoid full of pus or a tonsil that is septic, and the infection must be treated surgically.

Of course, the whole thing resolves itself ultimately into a matter of prophylaxis. Teeth must not be allowed to get into the deplorable state in which we both so often find them. This requires education and I congratulate your profession on the magnificent work it has done in this connection by the wholesale examination of school children and the establishment of free clinics in the schools and congested districts. I envy you the power you exercise over most of your patients to make them return to you at certain intervals for examination. I have tried to do this with every patient I have seen in the last three years and I have two who realize the honesty of my purpose.

In conclusion let me ask that the two professions co-operate to the fullest to determine the result of radical removal of badly infected teeth on the one hand as contrasted with the conservative treatment of such cases on the other hand. Let us try to determine when you may save us from losing a tooth and when losing a tooth may save us perhaps from a fatal disease.

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Operative Procedures in Relation to Dental Caries and Diseases of the Investing Tissues.

By ARTHUR D. BLACK, A.M., M.D., D.D.S., Chicago.

Read before the Panama-Pacific Dental Congress, San Francisco, Cal., Section VIII, September 2, 1915.

A review of the literature of the procedures in operative dentistry for the past sixty odd years reveals a peculiar lack of relationship between the pathology of dental caries and the diseases of the investing tissues of the teeth and the means employed in treatment. The lack of consideration for the investing tissues, because of failure of appreciation of their functions when in good health, and insufficient knowledge of the pathological changes when diseased, is one of the striking characteristics of dental practice.

It is not the intention of the author that this paper shall review in detail the progress which has been made in co-ordinating pathology and treatment, but attention will be called to certain things which have been more or less epoch making in our advancement.

Previous to 1890 little mention of the pathology of caries will be found in the literature of operative dentistry. The principal thought in the minds of most dentists previous to that time seems to have been to cut a cavity of such form that a "plug" might be placed securely. Even Dr. Miller, to whom all honor is due for the discovery of the micro-organisms which cause caries, had practically nothing to say of the pathology in relation to operative treatment. This was probably due to the fact that for a number of years he and others of our best men thought to treat caries by destroying or inhibiting the growth of the organisms, just as Koch expected to cure tuberculosis by destroying the tubercle bacilli. These studies apparently led Miller away for the time at least, from the more careful study of other details in the pathological process which later formed the basis of proper operative treatment.

Filling Between Teeth.

Among the few early efforts at treatment of dental caries, that of Robt. Arthur, in filing away the proximal surfaces of the teeth to treat or prevent proximal decays, should be mentioned. Here was a plan—an effort to treat the disease—based upon the observation that proximal decays generally occur a little to the gingival of the contact point. It was reasoned that if the enamel of that portion of the teeth were cut away, such decays would be prevented, and the view was correct. But it did not require many years to learn that the destruction of the interproximal soft tissue was much more serious than the proximal decays,

because this treatment permitted the impaction of food between the teeth so filed, and this resulted, not only in new decays in the region of the gingival line, which were much more difficult to treat than the ordinary proximal decays, but also in serious disease of the periodental membrane.

The practice of extracting four bicuspids to give the teeth room to separate a little, was another similar effort.

Closely akin to the above was the plan of using "separating" files to cut away portions of proximal surfaces as a part of their preparation to receive fillings. Before the use of cohesive gold became general, this was necessary for both access and retention, and as the contour cou'd not be restored with non-cohesive gold, the spaces were necessarily left wide open, resulting in the mutilation and eventual destruction of the septal tissues.

It seems to require disaster and calamity to make us see things which we should have seen before. It required an Iroquois Theatre fire to make our theatres all over the country reasonably safe; the disaster of the *Titanic* was necessary to secure ample facilities in the matter of life boats, etc.; the more recent *Eastland* horror in Chicago will doubtless bring about more careful inspection and better construction of our lake and other pleasure boats. In the same way, many of the dental procedures of the early days, which resulted in such dreadful destruction of the investing tissues and the eventual loss of many teeth, with no one knows how great a toll of life from more serious conditions resulting secondarily, have opened our eyes to better methods of operating.

It was the combination of the discovery of the cohesive property of gold foil—also by Dr. Arthur—and of the rubber dam by Dr. Barnum, together with the recognition by a few of the damage resulting from the open contact, which lead to the effort to restore contacts by filling operations. Here was the beginning treatment by operative procedure for the prevention of disease of the investing tissues.

Extension for Prevention. Then came the proposition of "extension for prevention" as applied to cavity preparation in the treatment of dental caries. While this subject has

been discussed as much as any in our literature during the past twenty years, and therefore needs little mention here, I would like to impress the fact that it was based on a very careful study of the pathology of caries, and I believe it will go down in history as the first serious scientific effort to place the treatment of dental caries in proper relationship to the disease. This study included nothing of theory; only facts which have become quite clear to those who have been sufficiently interested to observe them. These studies dealt entirely with surface involvement of the enamel and consisted of: 1. A tabulation of many thou-

sand small (beginning) decays, which established the fact that practically all decays begin in certain positions which naturally group themselves into pit and fissure, proximal and gingival third decays. 2. The observation of the extent to which these decays might eventually spread on the surface of the enamel, which made it possible to establish reasonably definite lines of immunity. These have since been our guide in the preparation of outline forms of cavities.

Restoration of Contact to Protect Gingivæ. These studies of the progress of caries brought out prominently the importance of the healthy gingivæ as a factor in limiting surface extensions, and the necessity of so executing the filling operations that the best health of the gingivæ would be con-

served. This involved the study of normal contours and contacts in relation to diseases of both the hard and the soft tissues, and served to establish the fact that with every operation involving a proximal surface or a gingival third position, the future health of both the hard and soft tissues must be given due consideration. It seems that the profession does not yet sufficiently appreciate the relationship of the filling operation to the future health of the soft tissues.

Relation of Teeth to the Healthy Mouth. The most conservative treatment should be based on the fullest possible knowledge of the histological structure and physical functions of the tissues with which we are dealing; also of the pathological processes to which they are subject. Just as it is necessary to know the minute structure of the tooth in order to understand the beginnings and progress of caries, so is it essential that the structure, including particularly that of the specialized elements, of the gingivæ and periodental membrane be well known. We must also come to recognize more clearly than we have heretofore the picture of the healthy mouth, in order that we may be better able to detect the slight deviations from normal which will enable us to apply treatment for the protection and conservation of these tissues earlier than has been commonly done.

The problem of dentistry to-day is that of the clean mouth. The clean mouth is the healthy mouth. Natural forces are of much greater importance in maintaining mouth cleanliness than artificial cleaning. The mouth which will require the least of artificial cleaning, by either dentist or patient, is the one in which all of the teeth are present in normal occlusion, with the investing tissues everywhere entwined about the teeth, with gingivæ thinning away to almost knife edge crests on all buccal labial and lingual surfaces of the teeth—conditions which promote natural cleanliness by facilitating movements of foods over tooth surfaces and gingival margins to positions where they are controlled by the various muscular

tissues until finally ready to be swallowed, leaving the least possible residue in the mouth.

We should recognize the conditions necessary and the forces which operate to maintain the healthy mouth, also the injuries which result from any interference or interruption of these. Many have doubtless seen skulls of squirrels and other rodents which had suffered a fracture of a lower incisor tooth, with the result that the corresponding upper tooth was not kept of normal length by wear, and by its continued growth caused the death of the animal from starvation. In such cases the balance of action between forces, which normally operate to maintain health, is lost with disastrous results. So in the human mouth we often see injury and disease as a result of the lack of balance between normally opposed forces, as in the movements of teeth after the extraction of one or more. Practically every such occurrence diminishes the natural cleaning by vigorous mastication, and thus contributes toward disease. If the periodental membrane is seriously injured along one side of the root of a tooth, the balance of pull of the various fibres of the periodental membrane is lost and the tooth is moved out of position—away from the injured side. If the original injury is to the interproximal tissue, due to lack of contact of the teeth, or to an abncrmal contact, the inflammation will usually result in the movement of adjacent teeth and the gradual involvement and destruction of their investing tissues as well.

**Gingivitis
Due to Faulty
Dental Operations.** Carefully compiled statistics show that in the mouths of young adults—between the ages of twenty and thirty-five—there are, on the average, about eight areas of gingivitis per mouth, and that more than half of all such inflammations are due to dental operations, in the performance of which the dentist has failed to restore proper contours or contacts. These inflammations are the beginnings of disease involving the periodental membrane, and a full understanding of the pathology of both will result in greater care in each operation performed.

We must presume that dentists have generally failed to recognize or appreciate the connection between the imperfect operation and the pathological condition which has resulted, because if the relationship were appreciated, we can hardly believe that so large a number of cases would continue to present in which the imperfect dental operation is the direct cause of the disease of the periodental membrane.

**Natural Cleansing
Better than
Artificial Cleansing.**

Many members of the profession seem to be over zealous in their efforts at artificial cleanliness without exhibiting in their operative procedures sufficient appreciation of the highest efficiency of natural cleanliness by the maintenance of the best possible contours

and contacts. It is far better to so perform our operations that there will be the most effective natural cleaning by mastication, requiring so little of artificial cleaning that this may be done for the most part by the patient, than to establish as a result of imperfect operations conditions which make natural cleaning impossible and much artificial cleaning imperative.

The principal thought in the preparation of this paper has been to emphasize once again the fact that not only recurrences of decay, but also a very large percentage of cases of disease of the periodental membrane are preventable by the institution of more careful technic in operative procedures; that our treatment of the mouth, by filling operations and otherwise, should be undertaken and carried out quite as much on the basis of the condition of the soft tissues as of the hard. To do this as a regular routine procedure, we should make a definite record of each area of inflammation of the investing tissues as a part of a very critical examination of each mouth. We should have fixed in our minds the picture of the clean, healthy mouth in order that we may be able to recognize the slight deviations from health in the soft tissues, and that we should study out the cause of each area of inflammation and each decay. We will then be able, by the prompt correction of such causes—in most cases by the employment of properly planned and skillfully executed operative procedures, to maintain a larger percentage of mouths in good health to old age.

The technic of such methods is not to be presented here. The technic will vary much for different cases, but will consist for the most part in the maintenance of proper contours and contacts.





Mouth Infection and Systemic Disease.

In this issue appear four papers to which we would call special attention, and it is our belief that any one would profit by reading them consecutively and at a single sitting.

The first by Dr. G. F. Logan, of Philadelphia, is welcomed as peculiarly timely. The communication is unique in its method of attacking a dental problem. Within the knowledge or memory of the present writer no other man has ever before dissected a dental theory entirely, or at least mainly by the rules of logic. And it is for this reason that we are glad just now to receive and give prominence to such a disquisition. The rank and file of our profession are all too prone to follow leaders; to accept as final the dicta of its best known men; of its habitual writers. The rank and file, busily occupied in the humdrum work of "supporting their families and educating their children" are unable themselves to test out the utterances of our research workers, by carrying on experiments, either similar to, or dissimilar from those through which these men's conclusions have been reached. Yet it is by the work of the rank and file, the great middle class of dentists so to speak, that dentistry and dentists are finally judged by the communities among whom they live and for them they are presumed to render the best service.

The layman rarely knows anything about the pronouncements of our scientists, except when some unusual theory is given prominent place

in the lay press, and then usually the information is mixed with much misinformation; hopes are engendered, and if not fulfilled the dentist falls back to even a lower place in public esteem than that which he had enjoyed priorly.

It therefore follows as a logical sequence that the duty of the professional man requires, that if he be a research worker he should make no announcements of discoveries, until prepared to have his deductions tested by the strictest rules of logic; and if he be merely the man addressed he should test out the communication in regard to an alleged discovery by strictly logical rules, before acquiescing in the deductions.

Just at the present time the medical and dental world are passing through a critical period. Medical and dental research workers are repeatedly asserting that causal relations exist between oral foci of infection and systemic lesions.

It may be safely stated that already enough evidence has been brought forward to sustain the general postulate that "a distant systemic lesion may be the offspring of a local oral focus of infection." But let it be constantly borne in mind that *evidence*, even a great mass of evidence, all indicating the existence of a certain condition, is not necessarily *proof* that the indicated condition does actually exist. Any one will admit this, if he would but attend any trial of an important issue; if the jury were asked to render a verdict after hearing the prosecution's case only, they probably would convict the accused. After hearing the counter evidence they frequently acquit him.

Therefore it would be well if all our readers would read Dr. G. F. Logan's paper, not once but several times, that their minds may be induced from now on to apply the test of logic to the communications of the past, present, and the future in regard to oral infections and their relations with systemic disease.

**The Test
of Logic.** Dr. Logan tells us that, "It may enable the reader to follow the argument better if he will keep in mind the absolute necessity of a cause being invariable in its action; that causes are mere links in changes; the change that immediately precedes another change is the cause of the second change, and the second change immediately becomes the cause of the third change."

Later on he gives us a working syllogism, symbolized thus: "P is M." "S is P." Therefore "S is M." Applying this to the problematic relation of tartar as a cause of pyorrhea he thus expresses it; "Pyorrhea is always caused by tartar. Mrs. Jones's teeth are coated with tartar. Therefore Mrs. Jones's teeth are pyorrhreal."

But the present writer has no wish to follow Dr. Logan on his excursion into the discussion of this problem along the route of logic, but rather to lead the reader's mind into a possibly similar consideration of the greatest of all dental problems "the true relation of mouth infection to systemic disease."

We are told now by a great many of our best thinkers that a blind abscess at the end of a tooth root may induce arthritis, endocarditis and even death. A few have not even been careful enough in their announcements to interpolate the word "may." But we shall now see that this word short as it is, is of extreme importance. For example we might erect a syllogism of this sort.

"Arthritis is caused by streptococcus viridans. Streptococcus viridans is commonly found in blind abscesses. Therefore blind abscesses cause arthritis." Or thus; "Arthritis is found associated with blind abscesses. The abscessed teeth are extracted and the disease disappears. Therefore the blind abscesses caused the disease." These, and several similar syllogisms indeed are about the sum and substance of the evidence thus far offered. Syllogisms like the above, tested under the rules expounded by Dr. Logan would not stand, because his final conclusion in regard to a similar syllogism in relation to tartar as a cause of pyorrhea reads thus: "If then we concede that pyorrhea is ever possible without the presence of tartar, then * * * * * tartar is never the cause or even an element in the cause of pyorrhea."

Similarly one might say; "If arthritis ever exists in the absence of a non-fistulous abscess on a tooth root, then we cannot declare that arthritis is caused by a non-fistulous root abscess."

But this is not sound logic, though an argument having some weight. The syllogisms used, though accurately expressing many of the claims that have thus far been made and used as a basis for the argument that tooth abscesses have been the direct causal factors in arthritis, endocarditis and other lesions, are not fair statements of the true conditions. The following syllogism is perhaps better.

"Arthritis is of bacterial origin and bacteria enter the system through a local port. The mouth is a local port, and the apices of teeth are often the propagating foci of bacterial infection. Therefore an arthritis may be a sequential result of an abscess at the end of a root."

The word "*may*" it is seen here assumes great importance. Dr. Logan interjected the word "*always*" (tartar is always the cause of pyorrhea) and the postulate falls under logical rule. But if we say "*may*" the postulate of systemic infection from root abscesses, not only does not fail, but on the contrary we are forced to further research and further argument before we arrive at the truth. Thus, the last syllogism declares that in arthritis (and this is even more clearly seen in endocarditis) "the bacteria enter the system through a local port." Let us then say, "the mouth is a local port, therefore the bacteria may enter through the mouth." But this is only the first link in the chain. The second link compels us to find a local sore or focus of infection within or adjacent to the mouth. We have besides tooth roots, likewise the crypts of the tonsils, and it is noteworthy that the tonsils were accused of being causal factors in rheumatisms long before the roots of teeth were even suspected. Suppose then that both tonsils and teeth are found infected coincidentally with the existence of an arthritis, which shall we blame?

The writer is not denying that non fistulous abscesses may cause arthritis, endocarditis and other important systemic lesions. He thinks they may, but he is pleading for more logical proof, so that in future we may definitely determine when the systemic disturbance originates in the mouth, and when it does not.

With this plea in mind we heartily recommend
Dr. Strietmann's Congress Paper. a perusal and study of the paper read at the recent Congress by W. H. Strietmann, M.D. That the theory of systematic infection through a local port of entry is not new is claimed by Dr. Strietmann where he says:

Systemic Infections of Local Origin. "For many years it has been known that systemic diseases of certain types resulted from infections which were originally and primarily localized to a certain definite circumscribed focus of infection.

Thus I might call to your attention an infection such as we meet in a carbuncle. Here the focus is primarily localized, but before long it extends

and I have no doubt that all of you have heard of cases in which the individual so afflicted finally succumbed to general septicemia, or as it is commonly known, a "blood-poisoning." You have also no doubt heard of such cases of blood-poisoning following a trivial accident such as a cut in the finger which became infected, or an infected abrasion of the skin.

"We know medically that syphilis has a primary focus in the so-called chancre and that subsequently the infection becomes generalized and invades the entire body. Gonorrhœa begins as a urethritis and may remain so—but on the other hand, it may become generalized and invade the joints of the body producing a gonorrhœal arthritis or "rheumatism," gonorrhœal endocarditis, or even a septicæmia which may prove rapidly fatal. I wonder also, if it has not come to your ears at some time or other that so-and-so died of blood-poisoning following the extraction of an abraded tooth?

"In other words it means that before a patient can be the victim of a generalized infection, the infective organism must have gained admission to his general system through some primary focus or port of entry. And it would not be unreasonable to suppose that teeth and the structures in which they are imbedded may sometimes be held responsible—as being the site of the primary focus. That such is really the case and not merely a generalization based on possibility we have now ample proof to demonstrate."

It is noteworthy that Dr. Strietmann here says that "****the teeth and the structures in which they are imbedded *may* sometimes be held responsible." Whether or not his next statement that, "We now have abundant proof to demonstrate this" be true, is left to the determination of each reader after studying his communication.

The paper read before the Congress by Dr.

Dr. H. G. Logan's Congress Paper. H. G. Logan of Chicago, presents valuable statistics along lines somewhat different to what has been presented by other investigators, and consequently

adds considerable weight to the plausibility of the theory that there is causal relationship between mouth infections and systemic disturbances. Dr Logan tested his cases by making blood examinations before and after treatment, in 162 consecutive cases. The fact that these were consecutive and not selected cases, and that they occurred in private practice and not in a hospital adds much to the value of the information presented by Dr. Logan. Classifying his cases into six different types, he found

fairly constant conditions, and equally constant the effects of treatment. The clearing up of the local source of infection was commonly followed by an improvement in the blood picture. This certainly is significant. Dr. Logan calls special attention to two cases, Nos. 70 and 79 and these certainly are extremely interesting. His most important conclusion however is as follows:

"Nor can one with any degree of assurance eradicate periapical infections by the mere extraction of teeth unless it be accompanied by a curetttement, for in two instances I have had patients go several months without any symptoms of the original secondary involvements and then have noted their reappearance without the development of any new focal infections, and upon making blood examinations I found the possible evidence of a chronic infection, although the tissue had healed with every appearance of being normal over the area where the tooth was removed. I then opened into the old infected tract, curetted it and in one instance the patient had a definite reaction similar to that experienced after injection of an autogenous vaccine during the original treatment. A second patient had a less marked reaction. Therefore it becomes necessary to do something more than to extract teeth or amputate roots and do an indifferent curetttement to secure positive elimination of focal infections associated with teeth."

Here we see that the blood picture was a reliable indication that a case was not cured, even though the clinical and outward appearance of the tissues would have induced one to believe that a cure had been effected.

**Responsibility
of Dentists for
Infections.**

Thus far the dental profession have only been asked to answer the accusation that they have contributed to mouth infections through imperfect root canal treatment and filling. Their reply has been that root canal treatment and filling is so difficult that only the most skilled may hope to master the technic; that some roots present obstacles which render perfect work impossible; and finally, that patients will not pay for it anyway.

Now another indictment is made that certainly should startle the dental profession from its self-satisfied assurance that aside from root canal treatment their work is all that it should be.

In a paper read recently before the Second District Dental Society of New York, Dr. W. T. Barrett, speaking of the treatment of

pyorrhea with emetin, declared that at the outset, in selecting test cases for treatment he had excluded certain suppurating cases as being not pyorrhea, even though pockets existed. Asked in the discussion to be more specific, he declared that suppurating conditions, accompanied by vertical destruction of the alveolar bone, thus instituting pockets discharging pus are often found when the cause has been faulty construction of fillings, crowns and bridges.

In this connection the paper read before the **Dr. Arthur D. Black's Congress Paper.** Congress by Dr. Arthur D. Black of Chicago, is most significant. The paper should be read in full, especially by those who may now honestly believe that their operative procedures cannot precipitate mouth infections. The following quotation summarizes Dr. Black's most important statement:

**Gingivitis
Due to Faulty
Dental Operations.**

"Carefully compiled statistics show that in the mouths of young adults—between the ages of twenty and thirty-five—there are, on the average, about eight areas of gingivitis per mouth, and that more than half of all such inflammations are due to dental operations, in the performance of which the dentist has failed to restore proper contours or contacts. These inflammations are the beginnings of disease involving the periodontal membrane, and a full understanding of the pathology of both will result in greater care in each operation performed."

"We must presume that dentists have generally failed to recognize or appreciate the connection between the imperfect operation and the pathological condition which has resulted, because if the relationship were appreciated, we can hardly believe that so large a number of cases would continue to present in which the imperfect dental operation is the direct cause of the disease of the periodontal membrane."



THERE ARE A FEW communications from those interested in this depart-

- ◆ ment which we must consider this month, one of which is from Dr.
- ◆ E. F. Izin, who is apparently eager to break a lance in defense of Dr.
- ◆ Howe, and against the Boston Doctors who declare that children may
- ◆ eat candy. Dr. Izin writes as follows:

■ ■ ■

"TO STATE THAT SUGAR in the form of candy is necessary for the

- ◆ sustenance of the growing child is almost the most preposterous state-
- ◆ ment of modern times. Dr. Roessler a few years ago disposed of this
- ◆ matter in a very able article on the subject of sugar and candy. I main-
- ◆ tain and refuse to recede from the position that natural fruits and
- ◆ vegetables furnish all the saccharin required by anyone. Who ever
- ◆ heard of an individual being deficient in sugar? The candy habit of
- ◆ to-day is one of the most harmful practices of the twentieth century.
- ◆ I have little doubt that Dr. Howe voices my own views, though I have
- ◆ not had the pleasure of reading his paper."

■ ■ ■

NOW THEN, FRIENDS, if you must buy some candy, get ten cents' worth

- ◆ and eat it yourself. But do not give any to the kiddies!

■ ■ ■

THE FOLLOWING reads like a very practical suggestion, made by Dr. R.

- ◆ L. Graber, of Peoria, Illinois. This is a method of replacing a facing
- ◆ broken from a crown or fixed bridge:

■ ■ ■

"SELECT A FACING of proper size and color. From very thin copper make

- ◆ a backing to fit the facing. This is merely to be used as a pattern,
- ◆ and we shall call it pattern number one. Next make a similar pattern
- ◆ of the space where the facing is to be replaced. Call this pattern number
- ◆ two. Place pattern number one over pattern number two and punch pin
- ◆ holes in number two, as indicated by number one. Place pattern number
- ◆ two (which now has pin holes in proper position), in space where facing
- ◆ has been lost, and using it as a guide drill pin holes through the backing
- ◆ left on tooth, or bridge, as the case may be. Now place pattern number
- ◆ two on new facing and grind facing to conform with the pattern. Set
- ◆ facing in place and grind pins flush with the lingual surface of crown

♦ or bridge. Remove facing, thread the pins, and then with a large round
♦ bur countersink the holes on the lingual side. Set facing with cement
♦ and fill around pins with amalgam, and smile while you do it. The
♦ entire operation should be done in twenty minutes, and done well."

■ ■ ■

NOW THAT WE ARE all insisting upon restoring occlusal form when filling
♦ teeth, either with gold inlays or with amalgam, the following very in-
♦ genious method, suggested by Dr. J. F. Mayer, of Philadelphia, will be
♦ found interesting. He writes as follows:

■ ■ ■

"THIS METHOD IS APPLICABLE only to teeth in which the entire masti-
♦ cating surface is to be restored. I use the die forms intended for striking
♦ up occlusal cusps for gold shell crowns, and I strike up a large variety
♦ of cusps, using 36 gauge copper. The cavity of the tooth having been
♦ prepared, I select a copper cusp of approximately correct size and form
♦ and place it upon the tooth to be filled, burnishing the margins of the
♦ copper cusps, close against the natural tooth, so that it may not be dis-
♦ lodged when the patient bites upon it. I then have the patient bring the
♦ jaws together and bite upon the copper cusp, which is soft enough to
♦ yield under this stress, and thus is produced an accurate occlusion. The
♦ copper cusp is then inverted and thin tin foil burnished against the inner
♦ side, after which it is filled flush with amalgam. It is preferable to use
♦ one of the quick-setting types of amalgam, which is soft for a minute
♦ or two. The cavity is then quickly filled with same material and the
♦ copper cusp placed in position on the tooth so that the two amalgams
♦ come together and unite under pressure, which is best insured by having
♦ the patient close the jaws again. The mouth should be kept shut until
♦ the amalgam has begun to set, when the copper cusp can be lifted off
♦ and any excess removed. The result will give good reproduction of
♦ natural teeth and the occlusion will be accurate."

■ ■ ■

IT WOULD SEEM that better results might be obtained by using natural
♦ teeth as dies with which to stamp up the copper cusp matrices. The
♦ teeth could be imbedded in plaster so that only the morsal third would
♦ be exposed, and a low fusing metal counter could be made by using a
♦ ring and pouring the metal over them. The cusp matrices could then
♦ be swaged into these counter dies by any of the usual methods. It must
♦ be said, however, that the specimen filled tooth sent in by Dr. Mayer
♦ is very pretty, and proves that the method can be made useful.

■ ■ ■

SPEAKING OF THE TIME lost in using the indirect method of making
♦ cast gold inlays, Dr. H. Mason Perkins, of Boston, writes as follows:
♦ "For some time I have been making my inlays by the indirect method,
♦ and have always used Ames's copper amalgam. Of course, it requires
♦ four or five hours for the amalgam to become hard enough for use.
♦ For the past three months I have been using a quick-setting cement made
♦ by Klewe & Co. I pack the impression with this, being very careful
♦ in the packing, and in twenty minutes it is ready to be separated from
♦ my impression. Needless to say, the impression should be a good one
♦ with well-defined margins."

DR. E. MELVILLE QUINBY, likewise of Boston, writes as follows: "I have

- ◆ the temerity to apply for a modest seat at or in the vicinity of the
- ◆ Table. I am particularly interested in plate work, possibly from the
- ◆ fact that I have spent most of my life in an English atmosphere of den-
- ◆ tistry. The almost universal method with us with regard to partial upper
- ◆ dentures is as follows: Obtain a good impression of course, usually
- ◆ with impression compound. Then cast a high model as for a gold plate.
- ◆ Obtain zinc die and lead counter. Next take gold plate, 16 karats, gauge
- ◆ 30, about. Strike up a small plate, keeping it well up toward the ridge.
- ◆ With plate punch, punch holes all over the plate. If clasps are to be
- ◆ used, they should be soldered to this gold plate. A few stays are sol-
- ◆ dered to the plate to keep it firmly attached to the model during the
- ◆ flasking and vulcanizing processes. The plate is fitted accurately to the
- ◆ model and the teeth set up. This plate, or 'strengthener,' produces a
- ◆ plate which has the advantage of the maximum of strength and the
- ◆ minimum of thickness. The object of the vulcanite covering is partly
- ◆ because of the exposure, but also because vulcanite is more easily
- ◆ adapted to the rugae of the palate and fits better. If one wishes to
- ◆ have a trial plate, the vulcanizing can be done before the teeth are set
- ◆ up, and the teeth may be attached at a second vulcanization."



HERE IS A PRETTY old letter, but now that the war makes it difficult to

- ◆ get so many things, we may run out of separating silk, and the sugges-
- ◆ tions herein contained may help some one. In the Items of Interest
- ◆ for January, 1913, Dr. Van Woert described and illustrated a method of
- ◆ separating teeth with silk. He received the following letter from Dr.
- ◆ Edward L. Wharton, of Newark. After a few preliminary remarks he
- ◆ says: "I think you will be interested in the use of ordinary sewing tape
- ◆ for separating teeth. It has all the advantages of the ligature silk of
- ◆ which you speak, and which I used before using this tape, and to my
- ◆ mind the following additional advantages: The entire operation can
- ◆ be done by the patient, thereby taking none of the dentist's time. Any
- ◆ amount of separation can be gained, and if the cavity extends beneath
- ◆ the gum it will force the gum back so as to expose the entire cavity,
- ◆ by the simple expedient of using wider tape. The method is as follows:
- ◆ If the appointment for the actual work is to be on Wednesday, I ask
- ◆ the patient to put a piece of tape between the teeth on Monday night
- ◆ and cut it close to the teeth both front and back. Tuesday morning put
- ◆ in two thicknesses; Tuesday night three, and Wednesday morning four.
- ◆ Unless the teeth are very close together the patient can do this easily.
- ◆ If they are too tight together I use the immediate separator and put
- ◆ in the first tape myself."



THIS METHOD IS VERY OLD, of course. Probably much older than Dr.

- ◆ Wharton. Yet in some respects it is a good method. Old jokes, you
- ◆ know, are always good. Fact is, if a joke is poor it dies young. Dr.
- ◆ Wharton's letter is printed, however, because besides the good method
- ◆ which he describes it suggests certain comments which may be helpful.
- ◆ For example, he tells us that with tape of sufficient width gum tissue
- ◆ may be pressed away from the gingivus. Let it not be forgotten that

- ❖ the major part of all pain produced whilst separating teeth is due to pressure against the gum. The one prime advantage in the ligature silk method is that as it contracts around the contact point it likewise draws away from the gum, and that is the secret of its painlessness. If one must force gum tissue away, there is the old reliable method of packing the cavity with cotton saturated with sandarac varnish. A cleaner and just as effective method is to pack the cotton and sandarac between the teeth and tight against the gum and then fill the cavity proper with base plate gutta percha. If possible, leave this for a week, or even longer.

■ ■ ■

TO FORCE GUM AWAY from the margins of labial or buccal cavities use

- ❖ gutta percha. Where the cavity is shallow, a ligature silk should be tied around the tooth and over the gutta percha while the latter is still plastic. With a warm burnisher then pack the gutta percha tight.
- ❖ In two days the gum will have moved away so that an impression of the cavity can be taken which will show the gingival margin clearly defined.
- ❖ The cavity should be repacked between sittings if an inlay is to be made.
- ❖ At the second sitting frequently the rubber dam can be used. In the anterior teeth, if a cervical clamp cannot be placed, the dam can be kept above the cervical border by using a part of a small steel pin, and tapping it gently directly into the dentine at the tooth neck and above the cavity border.

■ ■ ■

REVERTING TO THE MATTER of separating teeth, it is precisely where

- ❖ teeth are very tight together that the ligature silk surpasses tape. There is almost no condition in which ligature silk cannot be used, whereas many places, notably between molars, cannot be treated with the tape at all. The tape, however, is often preferable in the front of the mouth, though it would seem best for the dentist to place at least the first piece himself. Some years ago Dr. C. Frank Bliven, of Worcester, introduced a tape coated with gutta percha. This was much more efficacious and more cleanly than the tape alone. Out Chicago way they steep the tape in white wax, and they say "it beats all." But you know how those Chicago fellows talk!



Extraction of Wisdom Teeth.

Editor ITEMS OF INTEREST:

Dear Sir:

Criticism from the competent, like discussion with the learned, is as helpful as it is welcome.

The unthinking and the inexperienced frequently indulge in superficial comment which, unchallenged, passes for knowledge.

To be helpful, criticism must be constructive. All students seek constructive information even if it be in disagreement with their own views.

In the ITEMS OF INTEREST for October I note a letter from Dr. W. T. Jones of Columbus, Ohio, in which my paper on "Wisdom Teeth," published in your August number, is "discussed." The letter serves but one useful purpose—it demonstrates the very marked advance of the dental profession. That the retrogression of Dr. Jones was thereby advertised is unfortunate.

Dr. Jones is certainly living in the past when he compared the present-day extracting specialist, or exodontist, with the "puller of teeth" and "easy ones too." The puller of teeth of Dr. Jones's present-day acquaintance was eliminated from professional consideration many years ago. The exodontist of to-day is a respectable member of society in the community where he resides and is a welcome member of all the societies, National, State and Local. Dr. Jones seems ignorant of these facts. As for the "easy ones too," except those teeth which are lost from pyorrhea the extracting specialist has no easy ones to extract.

In our larger cities most of the dentists do not extract at all but send such cases to the exodontist. They are generally teeth which have been drilled and reamed for posts in crown and bridge work until further effort for their retention is useless. These are not easy ones.

Other dentists do such as they can and send their difficult ones to the exodontist. Some use local anesthetics and recommend only those they have broken, none of which are easy by any means. Dr. Jones simply does not know.

Dr. Jones is careless in his reading. In the article referred to there is not a word about recommending operations for impacted or any other tooth to a regular surgeon.

The exodontist is perfectly familiar with the concomitants, eye, ear, nose and infections shown in clinical exhibitions as the results of lesions produced by these perverts. His abilities as a diagnostician are generally recognized by members of the medical profession and he is frequently called in consultation by the regular surgeon in these cases, but it would never occur to the writer to refer any case of impaction to the regular surgeon. The ones Dr. Jones speaks of, being supposedly those described under class four in the article published in your August issue as subject to a major operation, were spoken of as being recommended to the oral surgeon; the distinction between the regular and the oral surgeon Dr. Jones seems to fail of comprehension. The reason for recommending these major cases (No. 4) to the oral surgeon is not from lack of ability or skill in operating on them, but the busy exodontist cannot control his practice by appointments. He has his office hours from 9 a. m. to 4 or 5 p. m. as the case may be, and his only time to devote to them would be evenings or Sundays. We have several oral surgeons, M. Ds. and D. D. Ss., of excellent repute, and we have right here in Philadelphia Dr. M. H. Cryer the Dean of the Clan, and as these cases require ether anesthesia and hospital treatment the writer deems it good and liberal practice to pass them along.

Dr. Jones shows one gleam of lucid mental preception in his remark about the ruthless extraction of the second molar described under class 3, which draws attention to what may be a fact, that the writer may have failed to make the point clear. There certainly was no recommendation of ruthless extraction of the second molar for the relief of suffering caused by the slanting wisdom tooth. Indeed, in very few instances is such sacrifice necessary.

The cases under discussion were those slanting ones with crowns pressing against the posterior root far below the enamel collar of the second molar which makes their extraction almost impossible, even with bur and chisel without removing the second molar or, if this is not taken at the time of the immediate operation, the injury is so great that its loss is inevitable in the very near future, but why take both of them?

The recommendation is to remove the second molar and leave the wisdom tooth for further development.

Being free from caries and given room from its confined surroundings, whether straight or slanting it is better there than no tooth at all, and given space for its eruption without obstruction it can be the cause of no more trouble, local or otherwise than any other healthy tooth. So I repeat, "Why take both?"

It is very evident that Dr. Jones is living in the times of the "puller of teeth" and it might be well to suggest that he accelerate his gait and come along with the procession.

Sincerely yours,

J. D. THOMAS.

Correction.

Editor of ITEMS OF INTEREST:

Dear Sir:

In the report of my lecture before the Central Dental Association of Northern New Jersey, appearing in the ITEMS OF INTEREST for November, I find that I neglected to state that the photograph of the mandible of the lower jaw is from the Miller Collection at the University of Michigan.

Yours very truly,

M. L. RHEIN.

Local Anaesthesia.

Editor ITEMS OF INTEREST.

Dear Sir:

In Dr. Stern's recent article (Local Anaesthesia in Operative Dentistry) published in the September, 1915, ITEMS OF INTEREST, there appear several conflicting statements that in my opinion need rectification.

First: The essayist, like so many other writers on this subject, persists in using and advocating the pumping motion of the syringe when performing the maxillary tuberosity and mandibular injections, and I suppose in the infra-orbital as well. Now, this "moving the syringe backwards and forwards" as the essayist advises, this pumping motion was advocated several years ago, and its purpose was to prevent the needle-point from remaining in the artery, had it by ill-luck entered one. It becomes, however, immediately apparent to any one who stops to consider it that, should the needle luckily miss puncturing an artery (as it always does) upon its initial full insertion, the advocates of this technique would give it (the needle) fifteen to twenty more chances by their repeated jabs. Moreover, since the syringe is never held so steadily, nor the jaws so motionless as to prevent the needle from deviating upon each successive pump from its initial path, it follows that not only are the chances increased for the very thing

they wish to avoid, but the chances for post-operative pain and trismus as a result of the laceration that the tissues are subjected to, are almost guaranteed.

I refrain from saying more than a word of the impossibility of this occurring accidentally, and of the difficulty I have experienced in endeavoring to inject an artery in the living subject intentionally. The reason for this is, of course, due to the slippery resilient coat and to the comparative dullness of the ordinary needle. Of arterial anesthesia, Prof. Braun says, "it is of value in tubercular patients, in the aged with bronchitis and heart lesions, and other cases which are not suitable for general anesthesia."

The essayist on page 655 of the same issue writes as follows: "Infiltration anesthesia seems to involve a slight danger to the pulp, as may be observed in the following cases recorded, all injected for the purpose of preparing cavities where the dentine was highly sensitive. Most of these cavities were superficial.

Method	Number of Cases	Hyperaemia	Death of Pulp
Infiltration	86	9	2
Conductive	193	None	None

While the essayist employs the term "seems" in his text his table is without it, thus implying definiteness without qualification. The "*slight*" danger that seems to be involved, we read, is nothing short of hyperaemia or death of the pulp. He farther remarks, "unfortunately I have no data as to the condition of the pulps prior to the injection." Which is sufficient to clear and exonerate the infiltration method. Though I rarely employ this method it is not because it is in the least dangerous but rather because it is somewhat painful, the injections being made into hard, firm taut gum tissue, whereas in the conductive regions the tissues are loose and cellular.

Novocain, characterized by its blandness whether injected perineurally, endoneurally or infiltrated, or when packed into an open wound will invariably permit the tissues to regain their normal state. In fact, novocain appears to hasten wound healing and even in operations for cleft-palate where undisturbed circulation is of the utmost importance, I have found it without fault. Furthermore, if a purposely infected solution be injected, say into the apical region of an incisor we would not only expect the death of the pulp but of the surrounding tissue. For, any contaminated solution passing through the lamella does not possess any *selective* action on the pulp, the pulp becoming affected only when the area concentric to it succumbs. The surrounding tissue remaining normal, one may rest assured that the pulp will not suffer.

Very truly yours,

S. L. SILVERMAN.

IN MEMORIAM



Memorial to Dr. W. Xavier Sudduth.

Dr. W. Xavier Sudduth, a distinguished associate fellow of the American Academy of Dental Science, died at Roundup, Montana, May, 1915.

Dr. Sudduth graduated from Illinois Wesleyan University 1873, receiving the degree of M.A., graduated from Philadelphia Dental College 1881, and also studied in Heidelberg and Vienna 1888-1889. He practiced dentistry in Illinois for about two years, when he became connected with the University of Minnesota as Secretary of the College of Dentistry and Professor of Embryology, Oral Surgery and Pathology and was Dean from 1892-1895. He was also much interested in histology and the therapeutic use of hypnosis. His clinical work was oral surgery.

Dr. Sudduth was a man of marked ability, integrity, and resources. He wrote a great deal, contributing to text books, and at one time was Editor of the International Dental Journal. He went to Montana from Minnesota, taking up his special hobby of horticulture and cattle-raising. He was much interested in the subject of cattle-feeding which led him to the raising of alfalfa. He was known as the "Alfalfa King."

Resolved: That in the death of Dr. Xavier Sudduth the Academy mourns one of its most distinguished associate fellows, a man of marked ability and one who was ever an honor to his profession.

WILLIAM P. COOKE

A. I. HADLEY

HENRY H. PIPER.

In Memory of Dr. G. U. Black.

It becomes the opportunity and joy of comparatively few members of a profession to know intimately its greatest leaders, but it is the privilege of all through imagination, sympathy and reverence to break down the barriers of time and space and enter into very vital relations with what is worthiest in the life of professional men.

With feelings like these the members of the American Academy of Dental Science desire at this time to honor the memory of Dr. Greene Vardiman Black whose recent death strikes from its honorary list a dis-

tinguished name and leaves the dental profession everywhere the poorer by his absence, but richer in the inheritance he has left behind him.

Dr. Black's life was unusually varied in its activities within the profession and singularly rich in its accomplishment. He was connected with three dental schools but his great work was done in connection with the Northwestern University Dental School at Chicago, in which he was a professor for twenty-four years and Dean from 1897 to the time of his death. Modest in demeanor, genial and kindly in his relation with his fellows he was yet filled with a passion to make real and practical what he felt to be important and to enrich the profession with the best of which he was capable. Honors and opportunity for service come unsought to such a man, and they came to him in full measure. He was president of the Illinois Dental Society, first president of the State Board of Dental Examiners, president of the National Dental Association and was awarded medals for his contributions to dental science and literature. His contributions to professional literature were especially numerous and important. For this and much besides it is a satisfaction to honor this eminent member of the dental profession, but it becomes a privilege to honor him in addition for his catholic spirit, his wide sympathy and his manliness. His life work retained interest for him to the last and with the memory of him there will always be mingled the thought of a well rounded character.

WILLIAM P. COOKE
HENRY H. PIPER
AMOS I. HADLEY





State Society Meeting.

OHIO STATE DENTAL SOCIETY, Columbus, Ohio, December 7-10, 1915.
Secretary, Dr. F. R. Chapman, 305 Schultz Bldg., Columbus, Ohio.

American Institute of Dental Teachers.

The annual meeting of the American Institute of Dental Teachers will be held at Hotel Radisson, Minneapolis, Minnesota, January 25, 26 and 27, 1916.

There will be a number of interesting papers, reports and discussions by prominent dental educators. All dental teachers are cordially invited to be present.

J. F. BIDDLE, Secretary.

517 Arch Street, N. S. Pittsburgh, Pa.

Important Postponement.

The meeting of the National Association of Dental Faculties which was to have been held in Minneapolis, January 28-29, 1916, has been postponed to meet in Louisville in July, 1916. The exact dates will be announced later.

B. HOLLY SMITH, Chairman Ex. Com.

Wisconsin State Board of Dental Examiners.

The semi-annual examination of the Wisconsin State Board of Dental Examiners will be held at Marquette University, Milwaukee, Wis., beginning 9 A. M., Friday, December 17th. All applications must be in the hands of the Secretary by December 7th.

For further particulars write Dr. F. A. Tate, Rice Lake, Wis., Secretary.

Rutland County Dental Society.

The Rutland County Dental Society held its first meeting of the season Wednesday evening, November 10th, and the following officers were elected for the ensuing year: President, Dr. Thomas Mound, Rutland; Vice-President, Dr. G. L. Gutterson, Fair Haven; Secretary, Dr. Grace L. Bosworth, Rutland; Treasurer, Dr. Paul H. Blanchard, Rutland.

Meetings are held once each month, and nearly every dentist in the county is identified with the Society, thereby making them interesting and profitable.

GRACE L. BOSWORTH, Secretary.

Name Advisory Board for Dental College.

At a recent meeting of the Dallas County Dental Society, attended by members of the Faculty of the State Dental College, a resolution was unanimously adopted accepting a proposition whereby the management and direction of the college is placed in the hands of an advisory board composed of Dallas members of the County Society. This board was named as follows: Drs. Bush Jones, J. W. Halsell, A. L. Frew, S. L. Barron, J. R. Beachum, G. Waller Staples, J. J. Simmons and C. L. Morey.

After the meeting of the County Society the Advisory Board went into session and elected the following officers: Dr. J. S. Simmons, President; Dr. Bush Jones, Vice-President; Dr. C. L. Morey, Secretary; Dr. J. W. Halsell and Dr. A. L. Frew, new members of the Board of Directors.

The proposition to the above effect was made by members of the Faculty of the State Dental College to a committee of the County Society, and was generally discussed at last night's meeting and met with unanimous endorsement. The Board will take charge of the management of the College at once.

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